TOO SAFE TO BE SAFE:

SOME IMPLICATIONS OF SHORT- AND LONG-RUN RESCUE LAFFER CURVES

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INTRODUCTION

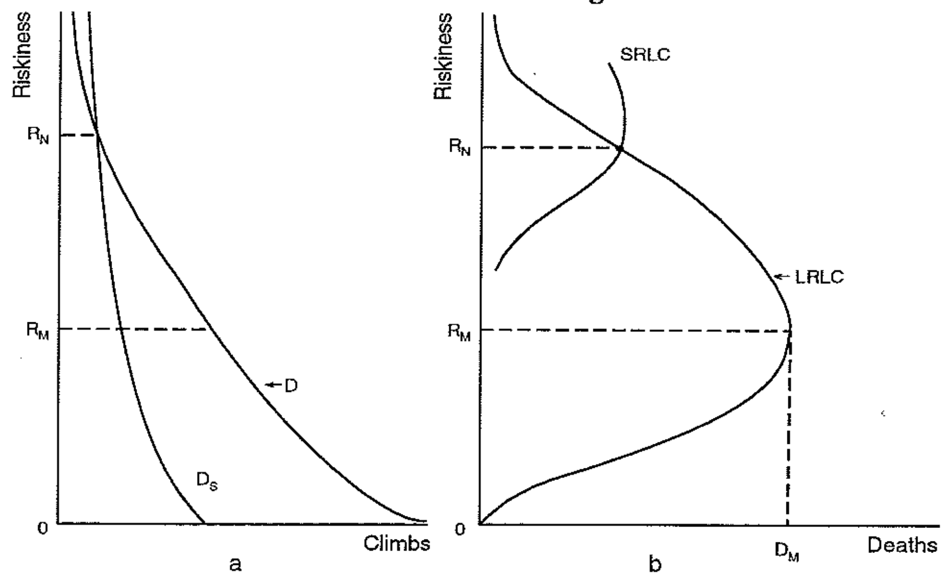
People who risk their own lives to save the lives of others inspire us because their actions mock the mundane calculations of ordinary life. So, it requires economists to stand bravely in the face of ridicule and ask: At what point do we violate efficiency norms by rescuing too many people?

No matter how noble, all activities are costly, and economists are duty-bound to constantly emphasize this unfortunate, and conveniently ignored, fact of life. Resources devoted to daring rescues could be put to other worthwhile purposes. At some point the value of what is sacrificed becomes greater than the value of saving more lives with additional rescue efforts. This point, so obvious to economists, need not be elaborated here. Economists also know how difficult it is to convince others that one can be genuinely compassionate without ignoring opportunity costs. Indeed, the tendency for people to see compassion only in terms of direct and immediate consequences can create the rescue costs on which we focus in this paper. The most important cost of saving people in distress can be an increase in the number of people who die.

At a fundamental level our point is obvious: people respond in predictable ways to changes in relative costs. If rescue efforts reduce the risks of engaging in an activity, then more people will engage in it, and they will engage in it differently.[1] The effect of rescue attempts can be swamped as more people expose themselves to risky conditions and do so with less precaution. So, rescue efforts can have the perverse consequence of increasing the number who die. The important question is: Why would rescue efforts be pushed to the point where, at the margin, more lives are lost than saved?

We consider this question by developing a simple model that distinguishes between the short-run and long-run participation responses to changes in the risk of an activity. These responses are captured in what we call rescue Laffer curves[2], which connect the risk of an activity with the number of deaths from engaging in it. If the

FIGURE 1
The Demand Curve and Resulting Laffer Curve for Mountain Climbing



relevant time horizon corresponds to the long-run rescue Laffer curve, then a reduction in risk will not entail an increase in the number of deaths.[3] However, if the relevant time horizon corresponds to short-run rescue Laffer curves, then it is likely that risk will be reduced to the point of causing more deaths.

Rescue policy decisions are political decisions which are often driven by short-run considerations. Such considerations are especially likely to dominate deliberations when the trade off is between the immediate threat to identifiable lives versus the eventual threat to statistical lives. Our analysis establishes the real possibility that rescue policy will fall into what Tullock [1975] has described as a transitional gains trap. The reduction in deaths from increased rescues is a transitional gain that can trap public policy into funding a level of rescue effort that, on net, increases deaths rather than saves lives.

THE CASE OF MOUNT MCKINLEY

In many situations public policies, crafted to save lives and/or reduce losses, end up exacerbating rather than solving the problems. Government attempts to rescue climbers on Mt. McKinley illustrate our point. The highest peak in North America, Mt. McKinley has long been considered a demanding test of mountaineering skill and bravery. Since the first expedition attempted to reach Mt. McKinley's summit in 1903, the mountain has claimed the lives of sixty-one climbers (as of 1990). From our perspective, the most interesting fact about these fatalities is that thirty-four of them

(56 percent of the total) occurred from 1980 to 1989, a decade that followed by several years the beginning of serious rescue efforts [Sherwonit, 1990, 275]. The early climbers had an important safety advantage (incentive) over present-day mountaineers: they were completely on their own. There were no rescue groups to call on, no government agencies watching over the mountain, no helicopters or planes capable of flying injured climbers off the mountain. To survive a McKinley expedition, the earliest climbers knew they had to rely strictly on their own skills and good judgment. And they succeeded extremely well. From 1903 to 1913, forty-seven men attempted to reach the top of North America. None died and by all accounts none was seriously hurt [*ibid.*, 276].

The first helicopter rescue occurred in 1953 and was followed by one each in 1960 and 1967. During the mid-to-late 1970s and throughout the 1980s the government assumed ever-increasing responsibility for climber safety. If an individual or team found itself in trouble, the Park Service would not only organize and coordinate search-and-rescue efforts, but pay the bill. Previously, because of the Park Service's limited involvement in rescue operations, costs had normally been paid by rescue groups or other government agencies, such as the Army or the Air Force.

By the 1980s, climbers had apparently begun to incorporate the rescue programs into their decision calculus, and both the number of climbers and the long-run death toll climbed significantly above their pre-rescue program levels. In all the years prior to 1970 a total of 35 rescues were performed. However, during the 1976 climbing season alone, there were 33 rescues. About one out of every eighteen people who attempted to climb the mountain had to be rescued. Jim Hale, a professional mountain guide operating on the mountain, observed, "You could really see a big attitude change in 1976. Back in the 1960s and even in the early 1970s, there was more of an understanding that people were on their own. They didn't rely on others for help. But in 1976, word got out that the National Park Service would pay for rescues. The prevailing attitude seemed to be "Don't worry. If we get in trouble, the Park Service will rescue us" [*ibid.*, 279].

Rescue costs are not passed on to McKinley mountaineers, or those who climb in other national parks, for one simple reason: the federal government has a strict national policy of providing search-and-rescue services without charge. Nor are bonding or climber-insurance programs acceptable as alternatives, as they also violate the government's no-pay policy. Many Alaskan guides argue that Park Service policies foster dependency rather than self-help. Gary Bocarde, operator of an Anchorage-based guide service, stated, "So many people up there expect someone to take care of them if they get in trouble. I've been involved in rescues where people say, 'Thanks for taking care of our partner,' then they are gone and we are left to take over" [*ibid.*, 284].

Besides Mt. McKinley rescues, there are many other examples of public policy that ignore behavioral responses. Peltzman's [1975] research on the relationship between automobile safety regulation and increased traffic deaths is relevant here. In response to public policies that require auto safety devices, drivers exercise less caution and traffic deaths rise, bringing renewed calls for even more auto safety devices. Peterson, Hoffer, and Millner [1995] tested the identical hypothesis on automobile air-bags, finding that drivers, after purchasing the equipment, drive more aggressively and as a group are more likely to be injured or killed than those without air bags. Federal flood insurance is another example. The federal government creates a subsidized program to provide flood insurance to lessen the losses of citizens residing in flood plains. The subsidy itself causes more people to build dwellings in flood plains and eventually flood losses go up, not down [*The Economist,* 1993]. This case is particularly applicable to our model because, as we demonstrate later, it specifically involves a lagged response and political myopia, which actually trap bureaucrats and politicians into lower insurance rates and higher losses than are in their long-run interest. Finally, Coast Guard attempts to rescue boaters encourage more boaters to venture farther out to sea in marginal boats under dangerous weather conditions. This eventually results in the loss of even more lives and increased political appeals to increase rescue attempts.

RESCUE LAFFER CURVES

An effective policy of rescuing people engaging in an activity necessarily lowers the risk of that activity. Everything else equal, the risk of an activity can be thought of as a price, with the amount of the activity demanded inversely related to that price. In Figure 1a we consider the long-run demand curve, D, for a risky activity, say mountain climbing, with riskiness (defined as deaths per climb) measured along the vertical axis, and the number of climbs measured along the horizontal axis. At a riskiness of 1 (certain death) the number of climbs will be extremely low (though not necessarily zero given a positive demand for suicide), with the number of climbs increasing as riskiness declines asymptotically toward the lowest possible level of zero.[4] The risk times the number of climbs gives the number of deaths from mountain climbing. Assuming, as seems reasonable, that the risk elasticity of demand declines monotonically as we move down the curve, and is equal to unity at some intermediate level of riskiness, given by R_M, then deaths increase as riskiness is reduced until R_M is reached, at which point deaths decrease as riskiness is reduced. The relationship between riskiness and deaths implied by D is shown in Figure 1b as *LRLC*, which we refer to as the long-run rescue Laffer curve. At a riskiness of 1 the number of deaths is extremely small, if not zero, and at a riskiness of zero the number of deaths is zero. The maximum number of deaths, D_M, occurs at riskiness level R_M.

The construction of the demand curve D, and the rescue Laffer curve *LRLC*, is based on the assumption that people are given sufficient time to make a full adjustment to each level of riskiness. D is the long-run demand curve and exhibits greater risk elasticity of demand than do short-run demand curves which allow less than sufficient time for full adjustment. For example, consider a short-run demand curve D_S that intersects D at riskiness level R_N in Figure 1a (R_N is the natural riskiness level — the riskiness level that exists with no rescues). If, because of rescue efforts, the riskiness level is decreased below R_N, the long-run demand curve D shows a larger increase in the number of climbs than does the short-run demand curve D_S. The adjustment time assumed for D is enough not only for existing climbers to adapt their climbing frequency, but also to reflect the behavior of all those who will begin climbing because it is now safer. The short-run demand curve D_S captures less than this full response, and is therefore much steeper than D.

The demand curve D_S implies a short-run rescue Laffer curve. As constructed, the point of unitary risk elasticity on D_S occurs above riskiness level R_N.[5] This means that in the short run, the number of deaths is decreased for any reduction in riskiness below R_N. So the short-run rescue Laffer curve corresponding to D_S, shown in Figure 1b as *SRLC*, is upward sloping at all riskiness levels below R_N. There is, of course, a short-run demand curve that goes through each point on the long-run demand curve, and a short-run rescue Laffer curve associated with each short-run demand curve, assuming a given adjustment time. The adjustment time upon which D_S and *SRLC* in Figures 1a and 1b are based is assumed to be equal to the time horizon corresponding to political decisions on rescue policy. All of the short-run demand and Laffer curves considered subsequently are based on an adjustment time equal to this political time horizon.

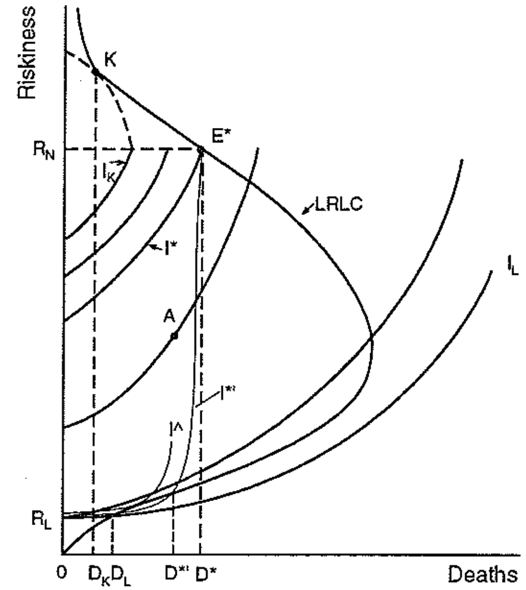
Buchanan and Lee [1982a, 1982b] first developed the implications of changes in the decision time horizon for these Laffer-type relationships. Vedder, Gallaway and Solars [1988] have generalized the Laffer-curve analysis to models of government income transfers published in *Public Choice*. Vedder and Gallaway [1995] also applied this model to determine optimum government size in a study released by the Joint Economic Committee of Congress. Clark and Lee [1996] extended the realm of application of Laffer curves to the non-traditional area of prison sentencing. By applying the concept to public policy and combining it with Tullock's transitional gains trap, what we are developing here could be called "the law of unintended secondary effects."

RISK-DEATH INDIFFERENCE CURVES: THE OPTIMALITY OF A NO-RESCUE REGIME

The rescue Laffer curves give the combinations of riskiness and deaths that are possible over the specified time horizon, but provide no information on the relative desirability of those combinations. To predict the rescue policy that will be pursued we have to consider what we would like to do given our previous consideration of what we can do. So in this section we present what we believe to be a reasonable representation of public preferences regarding rescue policy. These preferences are presented in the form of indifference curves with respect to the level of risk and number of deaths. We assume that these preferences are independent of the time intervals being considered—there are no differences between short-run and long-run preferences. A myopic political process may be impatient to reach a preferred position with respect to the trade off between risks and deaths, but what constitutes a preferred position is not affected by this impatience.

Everything else equal, reducing the number of deaths is desirable. So at any point in risk-death space, such as point A in Figure 2 (which is continued within the long-run rescue Laffer curve), a horizontal move to the right (more deaths) moves us to a less desirable position. On the other hand, since it is costly to reduce risk, everything else equal, cost can be reduced by permitting a higher level of risk. Therefore, a

FIGURE 2
Risk Death Indifference Curves



vertical move up from point A (more risk, holding deaths constant) moves us to a more desirable position, at least to R_N. This implies that the indifference curve that passes through point A is upward sloping, as are risk-death indifference curves in general.[6] Furthermore, plausible assumptions imply that these indifference curves are convex (have a positive second derivative). While the value of a life saved from additional rescue effort probably does not change much over relevant levels of effort, the marginal cost of reducing risk surely increases as risk is reduced. Therefore, as we move down an indifference curve, a larger decline in the number of deaths is required to compensate for the cost of reducing risk by a given amount.[7] Also, as we move to lower and lower levels of risk, we can expect eventually to reach the point where further reductions in risk are impossible, no matter how much is spent on rescue efforts. If people climb mountains some of them are going to die in the process. All indifference curves that reach low enough become horizontal at this minimum riskiness, which is shown as R_L in Figure 2.

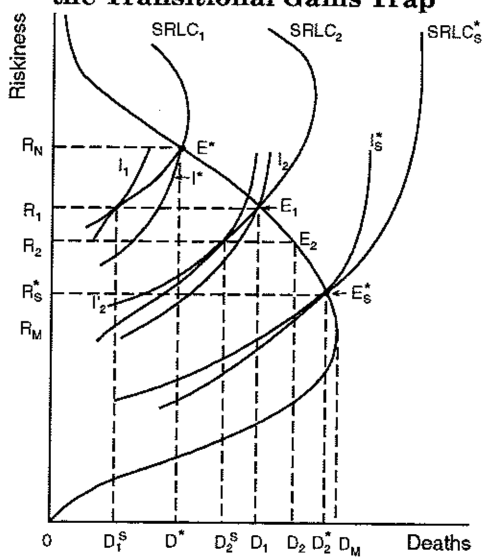
A number of risk-death indifference curves are shown in Figure 2 (with R_N on the vertical axis being the ideal point), along with the long-run rescue Laffer curve, *LRLC*, from Figure 1b. These curves are truncated at the riskiness level R_N.[8] As the curves are constructed, and given the constraint imposed by *LRLC*, the optimal rescue policy is no rescues, with the riskiness allowed to remain at R_N and the number of climbing deaths remaining at D^*. The indifference curve, I^*, that intersects *LRLC* at point E^* is the highest indifference curve that can be reached and maintained in the long run.

The preferred indifference curves to the northwest of I^* fail to connect with *LRLC* anywhere in the relevant riskiness region of R_N or below. It is possible to reduce mountain climbing deaths to D_L in Figure 2, significantly below D^*, but to do so would be so costly that we would be on indifference curve I_L, which is much less desirable than I^*.

We do not need to emphasize to economists the reasonableness of preferring situations in which more lives are lost to one in which fewer lives are lost. But for non-economists whose inclination is to reject such a possibility out of hand, let us consider a way of reducing deaths below D_L with a policy that we have ruled out so far by assuming away riskiness greater than the no-rescue level of R_N. It is certainly possible to increase riskiness above R_N and save lives by doing so. If, for example, the National Park Service initiated a policy of shooting 50 percent of those who climbed a mountain (fairness requires that those shot be chosen randomly), the number of deaths from mountain climbing would decline. This life-saving policy is illustrated in Figure 2, where we have extended as a dashed line indifference curve I_K above R_N. Indifference curves are negatively sloped above R_N since increasing riskiness is now more costly. As constructed, the extension of I_K is tangent to *LRLC* at point *K*, resulting in a policy that not only reduces deaths to D_K, below either D^* or D_L, but is also on an indifference curve preferred to either I^* or I_L. Surely, this policy recommendation will be rejected by almost everyone, especially by those who previously thought they would favor the policy that saves the most lives. Shooting people whose only crime is climbing a mountain is an unacceptably costly way to save lives, in terms of values not taken into explicit account in this analysis. Indeed, this discussion provides a strong rationale for not extending the indifference curves above R_N, or for assuming that the cost (broadly measured) of intentionally increasing the riskiness of mountain climbing is so large that at riskiness level R_N, all indifference curves turn back horizontally.

The optimality of the no-rescue policy is obviously not the only possibility. For example, if lowering riskiness to almost zero is not very costly, or if the value placed on reducing mountain climbing deaths is extremely high, the indifference curves in Figure 2 would be more steeply sloped than shown. In such a case, it could be that the indifference curve that intersects *LRLC* only at E^*, (not shown in I*) declines steeply enough to intersect the lower (upward sloping) portion of LRLC at a death rate less than D^*. This possibility is shown by modifying Figure 2 to show indifference curve $I^{*\prime}$ which intersects the lower portion of *LRLC* at death rate $D^{*\prime}$. In this case an indifference curve is preferred to I^* that is tangent to LRLC to the left of D^* shown in Figure 2 as $I^\wedge$, and there exists a policy of positive rescues that can permanently reduce the number of deaths below D^* and is preferred to the no-rescue policy. But we contend that our unmodified construction of Figure 2 represents a plausible situation, and that in some situations the no-rescue policy is the optimal one. We now turn to the possibility that the no-rescue policy will be rejected even when it is optimal, the result being a policy that leads to a transitional gains trap on a less-preferred indifference curve and to more mountain-climbing deaths.

FIGURE 3
Political Equilibrium and the Transitional Gains Trap



TOO SAFE TO BE SAFE IN POLITICAL EQUILIBRIUM

In Figure 3 we graphically depict a transitional gains dynamic leading to a perverse rescue policy from which it is difficult to escape. We begin at point E^*, the same no-rescue policy shown to be optimal in the previous section. If the time horizon relevant to decisions on rescue policy were long enough to be guided by the constraint *LRLC* (the long-run rescue Laffer curve), then the no-rescue policy would be chosen. However, as discussed above, the constraints incorporating the relevant time horizon for rescue policy are given by short-run rescue Laffer curves that only partially reflect adjustments to policy changes. So beginning at E^*, it is not *LRLC* that imposes the relevant constraint, but the short-run rescue Laffer curve that passes through point E^*, shown as $SRLC_1$ in Figure 3. $SRLC_1$ offers the tempting short-run possibility of reducing deaths and reaching a preferred indifference curve with a policy of positive rescue effort that reduces the riskiness below R_N. That this preferred outcome is not sustainable in the long run is of no consequence to the policy decision, given the political time horizon. The short-run political equilibrium is achieved where $SRLC_1$ is tangent to I_1 in Figure 3, with rescues lowering the riskiness to R_1 and the death rate to D_1^S.

The lower-risk R_1 will eventually motivate such a large increase in the number of climbs that the death rate will increase to D_1, with the long-run position on *LRLC* being given by point E_1. But once this point is reached it becomes possible to move down the short-run rescue Laffer curve $SRLC_2$ to a preferred position with a policy of

increased rescues. This continues to be true until the riskiness is decreased to R_2 and the death rate is decreased to D_2^S. Again, however, it is impossible to maintain this outcome as the death rate increases to D_2, with the long-run position on *LRLC* being given by E_2 in Figure 3. At E_2 it is again possible to reach a preferred position in the short-run, by moving down the *SRLC* that passed through this point (not shown), and the temptation to do so will prove irresistible given the myopic time horizon. And again the improved position is not sustainable in the long run. These transitional gains will continue to be seized, followed each time by a steadily worsening situation, until the position E_S^* is reached on LRLC. The short-run rescue Laffer curve, $SRLC_S^*$, that passes through point E_S^* is, at that point, tangent to the indifference curve I_S^*. Therefore, E_S^* is sustainable in the long run, and it is impossible to move from this position to an improved position in the short run. We have reached a rescue policy that satisfies the conditions for political equilibrium.

Whether one's objective is a rescue policy that is economically efficient or one that saves the most lives, the policy represented by E_S^* is clearly perverse. More is being spent to reduce risk than under the no-rescue policy, yet the death rate from climbing mountains has increased to D_2^* from D^*. Although the consequences of the no-rescue policy are far better than those generated by policy E_S^*, there is no political motivation to discontinue rescues since, over the politically relevant time horizon, doing so would result in increased deaths and movement to a lower indifference curve. Once climbers have adjusted to the expectation that rescue efforts will be made if they get into trouble, suddenly eliminating those efforts and letting identifiable climbers perish would require a measure of political courage possessed by few, if any, politicians. Alerting climbers that a no-rescue policy will go into effect at some specified future date could reduce the political costs of discontinuing the counterproductive rescue policy. But a statement that all rescues will be eliminated is not likely to be seen as credible once a rescue operation has been established. And if the statement is not seen as credible, it probably will not be credible, since making it will not lower the number of climbers who, over the political time horizon, will perish if rescues really are eliminated.

CONCLUSION

We believe our analysis gives insights into a serious problem that can plague government rescue policy. The noble objective of serving the public interest by saving lives, when coupled with a myopic political process, can increase the number of lives being lost and reduce the public welfare. The lives that costly rescue efforts save in the short run alter incentives that result in more lives lost in the long run. This can then motivate further costly rescue efforts that are again frustrated in the long run, with a political equilibrium eventually being reached that dominates the initial situation in both deaths and financial expense. Once this unfortunate situation has been reached, the response lags of a superior long-run policy of fewer rescues make a move to that superior policy politically unattractive.

The example of Mt. McKinley is consistent with rescue policies being caught in the transitional gains trap illustrated in Figure 3. We acknowledge that our analysis conveniently assumes constant a number of things relevant to the success of a rescue policy which are not constant in the Mt. McKinley situation or any other real-world situation. There can be an increase in the popularity of mountain climbing that is exogenous to the likelihood of being rescued. So, we do not claim that all the increased deaths on Mt. McKinley are explained as a response to the rescue effort. We do believe, along with those quoted in the second section, that the increase in rescues is an important factor behind the increase in the number of climbers on Mt. McKinley and the decline in their average climbing ability and judgment.

We also acknowledge that the construction of our diagrams biases our analysis in the direction of the most perverse possibility, (i.e., more deaths and a lower level of social welfare). It is possible, for example, that the natural rate of riskiness R_N is below R_M, the riskiness that maximizes the number of deaths. In this case, a myopically motivated reduction in risk below the efficient level reduces social welfare, but never increases deaths. The inefficiency in this case would be the result of too few deaths rather than too many.

Our model could be extended both in complexity and in the number of situations considered. But the simple analysis developed here serves our purpose of pointing to the possibility that the desire to save lives and myopic politics will result in costly and persistently perverse rescue efforts that cost lives.

NOTES

1. For example, Viscusi [1985] provides evidence that measures by the Consumer Product Safety Commission to "child-proof" bottles containing medicine altered behavior in ways that resulted in no measurable reduction in the risks to children.
2. We utilize the term "Laffer Curve" here simply to evoke images in the reader's mind of the type of mathematical relationship to which we refer. We fully realize that Laffer neither invented the concept for which he is most widely recognized nor extended the analysis to areas beyond tax rates and revenues. However, the reference is quite informative as a starting point to generalize the analytical tool and extend it to nontraditional areas where it has proven to be very useful.
3. Except in unusual circumstances considered in footnote 6.
4. The risk level one is not shown in the figures since almost all climbing would be discouraged at risk levels far lower than certain death.
5. This assumption is convenient, but not necessary for our conclusions.
6. It is natural to think of risk as a bad, as are deaths, and conclude that the indifference curves should be downward sloping. But the bad aspect of risk is captured in the number of deaths and risk is a surrogate for the cost savings from fewer rescues. Treating risk as a bad would produce downward-sloping indifference curves with the origin representing the ideal position. But, without altering the constraint given by the rescue Laffer curve, this would lead to the absurd conclusion that risk should be reduced as much as possible no matter how costly the reduction.
7. The slopes of the indifference curves also reflect the value of the additional climbing done as risk is reduced, a value that offsets to some degree the additional cost of reducing risk. If the value from additional climbing is large enough, the indifference curves can be backward bending for some interval of risk. This creates the possibility that even a far-sighted government rescue policy would be justified in reducing risks even though it leads to more climbing deaths. This possibility is not considered in our diagrams.
8. One indifference curve is extended above R_N for a reason that will become clear later. Assuming that R_N occurs well above the risk level associated with the maximum number of deaths increases the likelihood of the perverse result (the rescue effort in political equilibrium results in more deaths) we highlight in this paper. The implications of a lower R_N are considered later in the paper.

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