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NONCONSEQUENTIALIST PRECAUTION

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How cautious should regulators be? To those concerned with the ethics of environmental regulation, this is a central question. The answer bears directly on whether businesses and institutions should be allowed to risk harming people or the natural environment: on whether we allow the use of hydraulic fracturing to access shale gas; or the building of nuclear power plants; or the discharge of pollutants into the environment; or experiments in geoengineering. If we should be very cautious, then it may well turn out that such risky activities ought to be banned; if the appropriate level of care is lower, then it may well turn out that they should be permitted. And, if we determine that running such risks is permissible, the answer to our initial question will also bear on how these practices should be regulated: on what precautions, or safety features, or limits we require the risk-imposers to institute. The more cautious we should be, the more tightly we should regulate the risky activities we allow.

Given how central our question is, it is no surprise that answers to it are implicit in existing regulatory procedures. Take, for instance, the approach to regulation mandated in US President Reagan's Executive Order (and re-affirmed in Executive Orders issued by US Presidents Clinton¹ and Obama²). For federal regulatory agencies in the US, "regulatory objectives shall be chosen to maximize the net benefits to society; and "among alternative approaches to any given regulatory objective, the alternative involving the least net cost to society shall be chosen."³ The US government's answer to our opening question here is clear: we should be as cautious as is necessary to produce the most good possible. Any less cautious than this, and we will have failed to prevent some bad things from happening; any more cautious than this, and we will have restricted people's freedom in ways that make things worse overall.

Of course, agencies typically do not know ahead of time exactly what the costs and benefits of regulations will be, and hence can't know what regulations would produce the best results. Consequently, instead of being held to the standard of choosing what will *actually* be maximally beneficial, we should understand the point of the orders as requiring that regulators to choose based on what they *predict* will maximize value given what is known. Indeed, this is how the Office of Information and Regulatory Affairs has interpreted the Orders: "To value changes in risk arising from variability in expected outcomes as a consequence of regulation, agencies

¹ Executive Order 12866, 58 FR 51735, September 30, 1993.

² Executive Order 13562, 76 FR 3821, January 18, 2011.

³ Executive Order 12291, 46 FR 13193, February 17, 1981, §2(c) and (d).

should consider the *expected* net benefits of the risk change, taking into account the probability distribution of potential outcomes with and without the regulation.”⁴

It will come as no surprise that the U.S. government’s answer to how cautious regulators should be is controversial. Defenders of the Precautionary Principle, in particular, take themselves to reject it. What do they propose instead? Despite the fact that the Precautionary Principle is appealed to in laws, treaties and even constitutions, there is no straightforward answer to that question. But we can confidently say this much: whereas the U.S. government says we should be just cautious enough to maximize expected value, defenders of the precautionary principle say we should be more cautious than that. As the prominent Wingspread Statement on the Precautionary Principle puts it, “We believe existing environmental regulations and other decisions, particularly those based on risk assessment, have failed to protect adequately human health and the environment.”⁵

This is hardly a satisfying answer to our opening question, though, for it says nothing about what level of care is required beyond that which maximizes expected value. One way to zero in on a more precise answer would be to analyze specific cases in which regulating for maximum expected value seems to be inadequately cautious, and then try to extract more general lessons from them. An alternative strategy would be to start by thinking about the ethics of doing what those who are candidates for regulation want to do: namely, impose risks of harm on others in the pursuit of some kind of benefit. We could then use the moral analysis of risk imposition to motivate particular levels and kinds of governmental constraints on risky activity.

In the remainder of this paper, I will pursue the second, more theoretically driven strategy. In particular, I will detail some of the resources a particular strand of nonconsequentialist normative ethics – contractualism – can provide to defenders of the Precautionary Principle, and then think through what they imply regarding how cautious regulators should be.

Some will be less than sanguine about the prospects of this strategy. In a recent and incisive article, Barbara Fried has argued that “the effort to come up with nonaggregative principles to handle the problem of risk must fail — ... the problem of risk, by its nature, can be managed only with the sorts of interpersonal trade-offs that the contractualist enterprise is foundationally committed to rejecting.”⁶ It goes without saying that, despite some real challenges she raises for contractualists, I think that she is

⁴ Office of Information and Regulatory Affairs (1996), §III(A)4(d), emphasis added.

⁵ Available at <http://www.sehn.org/wing.html>

⁶ Fried (2012), p. 40.

mistaken. More particularly, I will argue that she has overlooked the promise of contractualism in a particular range of cases: namely, those in which we can identify those who can be expected to lose from a risk imposition. In these important cases, contractualism offers a compelling non-aggregative and more precautionary alternative to regulating for maximum expected benefit. But before showing how this is so, it will be helpful to think through contractualist approaches to the regulation of risk more generally.

At the heart of contractualist theories is the idea that our actions are permissible only if we can justify them to those people whom our choices affect. If someone we affect does not have sufficient reason to consent, if we cannot give her a justification for our action that is acceptable from her point of view, then we have not taken her into account in our actions in the way that her moral status demands.⁷

There are, to be sure, variations on this core idea. Different theorists have different accounts of precisely what kind of consent is necessary to render actions permissible, and correspondingly different accounts of what kind of justifications a person should accept for the purposes of legitimating another's action. To the extent possible, I will be glossing over many of these differences. But all of the theories I will be drawing on share the following feature: they will allow that personal reasons can be sufficient grounds for reasonably rejecting some kind of treatment. That is, in at least some cases, the fact that something would be bad for a person will allow them to reasonably reject it, even if it would be better for the world overall if the action were performed. This is a feature that most contractualist theories share, and for good reason. Insisting that something other than overall value matters morally is essential to nonconsequentialism. Contractualism of the sort that I will be working with takes that thing to be how burdensome things are from the individual's point of view.

Consider, for instance, the standard (for philosophers) case in which killing one innocent person will produce resources necessary for saving several others from death and thereby produce a better outcome overall. Some consequentialists will be committed to saying that morality requires the killing, while most other people think morality forbids it. Contractualists justify the more commonsensical response by appealing to the fact that the potential victim could reasonably object to being killed for the sake of several strangers. From her perspective, in which her interests are particularly important, her death is too steep a price to pay. And since she can reasonably refuse to be used in this way, the contractualist will say, killing her is morally forbidden.

⁷ The contemporary locus classicus is Scanlon (1998).

Given the appeal of this way of handling questions of harming some in order to benefit others, it would be tempting for contractualists to apply parallel reasoning in the standard regulatory issue of whether it is permissible for some to impose a risk of harm on others. Consider the following schematic case: a regulatory agency's risk analysis reveals that allowing businesses to pollute at a certain level will impose a 1:500,000 risk of contracting fatal cancer on 1,000,000 people, and that their cost-benefit analysis reveals that when the benefits of the industrial activity and the costs of reducing the pollution even further are taken into account, setting the regulatory ceiling at this level will maximize expected utility. Contractualists will ask whether it will be possible to justify this risk imposition to everyone. Initially, it seems that we cannot. The agency predicts that their regulation will permit business to do what will kill two people for the sake of providing benefits to others. And, as before, each of these people could reasonably object to being given cancer: from their perspective, their contracting fatal cancer is just too high a price to pay in order to secure the benefits of the industrial activity for others. The fact that what the businesses will do under this regulation would therefore be morally impermissible could then be used to ground an objection to the proposed regulation as insufficiently cautious.

This nonconsequentialist approach to the regulation of activities that impose a risk of serious harm certainly would count as an alternative to the Executive Order mandates. The trouble is that it has totally implausible implications. According to the analysis, a person whose life has been put at risk can reasonably reject the imposition, and this renders the risky activity wrongful. But nearly everything we do – from buying a cup of coffee in the morning to going to sleep at night – imposes a risk of death on others. There is a tiny chance that driving to the café will cause a fatal car crash; there is an even tinier chance that going to sleep will make us miss a phone call that causes a telemarketer to go home early and be struck by lightning on the way. The nonconsequentialist analysis above thus implies that nearly everything we do wrongfully imposes a risk of serious harm to others and hence that governmental agencies should not grant people the freedom to do anything. That would be taking precaution too far, to say the least.

One consequence of this failure is that whatever the Precautionary Principle's more precise answer to 'How cautious should regulators be?' is, it cannot be that governments should prohibit any activity that imposes a risk of serious harm on others.⁸ More importantly, we now have to find

⁸ Sunstein (2003) takes this to be a damning objection to the Precautionary Principle. And given that the Wingspread version of the principle reads 'When an activity raises threats of harm to human health or the environment, precautionary measures should be taken...' his charge has some initial credibility.

some other way of motivating an alternative to expected value maximization within contractualism. Asking whether those who are killed by a risky activity could reasonably consent to the activity given the outcome will not work.

The trouble with our first attempt was that a person's premature death will nearly always provide her with sufficient personal reasons to refuse to agree to an action that causes it. So if we are to find a contractualist analysis of risk imposition that doesn't condemn every choice we make, we need some way of excluding a victim's eventual death from the considerations that bear on her consent to running a risk that causes it. This may sound implausible, but there is one promising strategy. The key is to remember that, in most cases, whether there will be a victim – and if so, who the victim will be – can't be determined in advance. At the time the risk is run, any eventual victims will not have access to the fact that they will be killed. And so there is an important sense in which this fact is not available as a reason to inform their consent.

Put another way, the trouble with the initial proposal was that we were asking whether those affected could consent to a risk *after* its outcome for them had occurred and hence was known. But a contractualist could remind us that the central question of regulatory caution concerns what is permissible when we do not know in detail what the results of regulations will be, so asking what people could reasonably object to under this condition of uncertainty seems appropriate. The consent that is required is that which could be obtained at the time the risk is run, given the reasons that were available then. Since these reasons will be in terms of forecasts of the results of a choice rather than its actual results, what we would now be looking for is *ex ante* consent.⁹

Changing to *ex ante* consent can solve some problems of extreme over-regulation. If we want to know whether people would consent *ex ante* to the risks involved with allowing everyone in a household to go to sleep at the same time, the answer is easy. From each of our perspectives, the benefits of the freedom to go to sleep when we please will vastly outweigh the tiny chance that allowing everyone to do so will result in our death. Consequently, it would be unreasonable for any of us to object to people having this freedom. So far, so good. But now consider how shifting to *ex ante* consent changes the contractualist's analysis of our hypothetical imposition of a 1:500,000 risk of contracting fatal cancer on 1,000,000 people. Let us assume that all of the million people are situated similarly regarding the risk, and that a reliable cost-benefit analysis would show that allowing the pollution has a higher expected net benefit for them than

⁹ This would constitute a break with Scanlon (1998), as he there frames contractualism exclusively in terms of the *ex post* perspective. Recently, though, he has allowed that this might have been a mistake. See Scanlon (2013), p. 510.

prohibiting it does. With this information in hand, it is difficult to see how any individual could reasonably refuse the imposition of the risk. The chances of getting cancer are extremely remote, and the benefits they can expect from running the risk, we are assuming, are substantial and far more likely to occur. To reject such a risk means preferring what one expects will make one's own life – and the world overall – worse. And if everyone, so far as they are being reasonable, will accept that the benefits to them justify the tiny additional cancer risk, then a regulation that permits this level of pollution will be permissible on contractualist grounds.

The trouble here is not that this is clearly the wrong answer; instead, it is that by embracing *ex ante* consent as the test of permissibility, the contractualist has lost the grounds for objecting to maximum expected value as the criterion of legitimate regulation, at least in this case. The question for advocates of the Precautionary Principle, then, is whether there is something special about the example, whether there are features peculiar to it that generate the agreement between *ex ante* contractualism and consequentialism.

I think there are. A crucial assumption in this case was that all the people were situated similarly *vis-à-vis* both the risks and the benefits. As a result, not only was the expected value of the result of the permissive regulation best overall, it was best for each of those who would be affected by it. But contractualism's motivating concern is explaining the moral objection to harming some for the benefit of others. When everyone is an expected winner, as in the above case, contractualism's core concern isn't at issue, and so it is no surprise that it agrees with the consequentialist result. But risks are often not like that. Instead, many risky activities have likely winners and likely losers. And it is here that contractualism is likely to have its distinctive purchase.

Consider current debates over whether and how to allow hydraulic fracturing of shale gas deposits. I suspect that if fracking were to be permitted and regulated under the Executive Order approach, I would fall into the likely loser category: I wouldn't sell gas companies drilling rights to my land (and, in any event, my property is too small for them to want to pay) and I would be exposed to risks to my health and prosperity. Of course, allowing gas drilling could still maximize expected value overall: the net benefit to the winners might swamp the net cost to us losers.

Suppose it does. And suppose that I am right in thinking that it is likely that allowing fracking in my area would be worse for me than prohibiting it. It appears now that, even when we switch to *ex ante* consent, not everyone has sufficient reason to consent to fracking. I, in particular, can reasonably reject the drilling of wells in my area because doing so could be expected to make my life considerably worse. If so, then the gas companies' drilling would wrong me, and this could serve as a ground for objecting to a regulation that would permit it. Generalizing, the contractualist

conclusion would be this: governments must regulate so that risky activities are carried out only in ways whose expected value is not negative for anyone.

There are, of course, more compelling examples of people for whom some particular industrial activity has negative expected value. The environmental justice literature is rife with cases in which environmental hazards have been visited upon people who stand to gain very little from them. Because they are poor and/or lack political power, historically underprivileged groups are often exposed to risks, the benefits of which go to others. I don't mean to diminish the importance of these cases, and the contractualist account being explored here does indeed explain at least part of the wrongness they involve. But it is important to note that the contractualist analysis is not confined to such cases either. Just as it can be wrong to steal or assault the wealthy and powerful, it can be wrong to impose environmental risks on them as well.

At this point, however, we may begin to worry that the move to ex ante consent has not solved the problem it was initially meant to solve. For it is hard to imagine a kind of industrial activity whose expected benefits won't be negative for someone. But prohibiting all industrial activity would, once again, be to take precaution too far.

In particular, it would take precaution too far even for me, in the sense that generalizing my veto of fracking would yield a regulatory criterion that would imply that we should ban energy extraction altogether, and this would have negative expected value from my perspective. I'd likely be better off with fracking if the alternative were no large-scale energy-extraction projects at all. We might try to use this fact as a basis for revising the contractualist approach to assess whole systems of regulation, rather than individual regulations piecemeal. Although he doesn't motivate it within a contractualist framework, this is the strategy embraced by Sven Ove Hansson. In response to the problem of extreme prohibition when risk imposition is viewed on a case-by-case basis, he suggests that we should look at 'social practices of risk-taking.' More specifically he proposes the following criterion:

"Exposure of a person to a risk is acceptable," he suggests, "if (i) this exposure is part of a persistently justice-seeking social practice of risk-taking that works to her advantage and which she accepts by making use of its advantages, and (ii) she has as much influence over her risk-exposure as every similarly risk-exposed person can have without loss of the social benefits that justify the risk-exposure."¹⁰

¹⁰ Hansson (2013), p. 108. Fletcher (1972) is the pioneering work for the normative implications of mutually beneficial systems of risk imposition.

Given its complexity, it is no surprise that there are many questions that need to be resolved before we can really assess this criterion. For instance, what is it for a practice to be ‘sufficiently justice-seeking’? How much of a concern for justice, on the part of whom, expressed in what ways, is sufficient? Hansson doesn’t say. And how are we to specify ‘justice’ in a way that doesn’t render the criterion uninformative? Since in asking when a risk-imposition is acceptable, Hansson takes himself to be asking when a right to be free from risk imposition is defeated, the criterion seems meant to specify when imposing a risk does not constitute doing something unjust. And saying that a risk imposition is not unjust when and only when it is part of a system that is striving to not impose risks unjustly does not take us very far.

Our main concern here, however, is the shift in focus to ‘social practices.’ One challenge facing such an account is to specify the scope of such practices. Hansson considers and rejects several alternatives before settling on his preferred interpretation. The first he considers is very narrow: evaluating the practice of being exposed to specific risks. This, he thinks, will not solve the problem at hand. His example concerns focusing on specific chemical pollutants. If we assessed risk-impositions at this level of detail, he says, we would have to prohibit too much. There are likely chemicals that are released in the production of only certain products, and some people who will be exposed to them will have no interest in using those products and hence will not benefit from their production. For these people, the expected value of producing these products will be negative. But if we prohibited all such pollution, industry would be paralyzed. “In order to reap the advantages of modern society,” he says, “... we also need to engage in exchanges of different kinds of risks and benefits.”

This suggests that our focus should be on the entire system of risk-imposition, which is to say, nearly all of our interactions with others. The trouble here, as he notes, is that such a wide scope yields a criterion that is not practicable. A regulatory agency, for instance, has no control over – and no resources to monitor – the many kinds of risky activity that lie beyond its jurisdiction, yet it would have to take all these activities into account in determining what regulations were permissible. Determining whether regulators in New York should lift the current moratorium on fracking would require taking into account the aviation risks and benefits experienced by Californians. This would render responsible regulation practically impossible.

Hansson’s solution is to say that the relevant unit of evaluation is ‘social sectors,’ such as transportation, industrial production and healthcare. If the expected value of the transportation system as a whole is positive for everyone, for instance, then the risks imposed on others by those who operate according to its rules are permissible.

Some will surely wonder what motivates this level of analysis. Why the entire transportation system, rather than road transport more specifically? Why transportation alone rather than transportation and storage? These questions can wait, though, because taking sectors as the unit of evaluation does not really solve the contractualist's problem of being overly restrictive when it comes to risk. While the risky activities of many sectors of modern industrial society have an expected net benefit for most of us, this is not true for all of us. One prominent example in the contractualist literature is the Amish.¹¹ They are exposed to risks by passenger vehicular traffic, for instance, but the expected benefit of the modern transportation system is likely to be negative for them, opposed as they are to using it. Their situation is parallel to those who have no interest in using specific products. Since Hansson took the expected disvalue for some of making a product to rule out its manufacture if we were to assess risk-by-risk, it seems he must say that the expected disvalue to the Amish is enough to render the risks imposed by modern transport impermissible. Once again, this seems too restrictive: contractualists don't want a criterion of permissible risk imposition that would require us all to travel by horse and buggy.

By this point, the hopes of providing a compelling alternative to the regulatory pursuit of maximum expected benefit can seem dim. If contractualist regulators were to adopt the ex post perspective, it seems they must prohibit all conduct that creates a risk of serious harm, but this would paralyze society. This is not compelling. If instead they adopt the ex ante perspective, and are faced with a risk that would be shared equally by all, they will recommend exactly the same regulations as recommended by the expected utility maximizers. This is not an alternative to maximization. And when they are faced with risks with identifiable expected winners and losers, it seems that they must prohibit the risky conduct, since the expected losers can reasonably reject the risk imposition. But the existence of people like the Amish seems to guarantee that there will be expected losers of much of modern technology. And again, prohibiting most technological advance is not compelling. Fried's pessimism regarding contractualism is on the cusp of being vindicated.

But there is an option for contractualists that has been overlooked. Contractualists can point out that when a socially beneficial activity has expected net disvalue for some, prohibiting it is not the only way to protect these people from being wronged. Instead, we could require that those who engage in such useful but risky activities take greater responsibility for the distribution of its benefits and burdens. In particular, we could insist that, as a precondition of engaging in the activity, they take steps to insure that its expected value is not actually negative for anyone. Transposed into the language of economists, acceptable risks must be (expected to be) strict Pareto improvements.

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Consider again the case of hydraulic fracturing. Suppose that I am correct in speculating that fracking in accordance with the regulations recommended by the Executive Order approach will have negative expected value for some. Rather than banning it all together, regulators could respond to this fact by issuing rules that compel gas companies to operate in ways that change the distribution of costs and benefits so that no person could reasonably expect to be harmed by their activities.

How might they do this? The first step would have to be diagnostic. Rather than simply performing global risk assessments and cost-benefit analyses in order to determine aggregate expected value, regulators would have to focus on those who have the least to gain and the most to lose. Of course, the more publicly accessible the regulatory process is, the easier it will be to find those who fall into this category. With wide dissemination of information concerning the risks and rewards, and an open public comment period, those who are most vulnerable and/or their advocates are likely to self-identify.¹² A targeted cost-benefit analysis for them could then be used to reveal what and how much needs to be done to insure that the expected value of fracking is not negative for them, and hence that they could reasonably consent to being exposed to the risks that gas drilling would involve.

More specifically, since the expected value of the activity for each is a function of the costs and benefits for her, there are two paths regulators can pursue to the goal of universal reasonable consent: they can issue regulations that reduce the expected costs for those who are most vulnerable; and they can issue regulations that increase these people's expected benefit. Let's take these two strategies in order. Reducing expected costs will often mean putting extra safety measures in place so that the chances of a bad outcome are reduced. And if this is to be at all successful in improving the expected value for those who would be among the losers if we were to follow the Executive Order approach, these safety measures would have to go beyond what would be warranted if we were allowing the benefits to the winners to offset the costs to the losers.

Take, for instance, the standards for gas well construction. There is a tradeoff between how unlikely a well casing is to leak pollutants into the water table and how expensive it is to build. The benefit of lower construction expense comes at the cost of higher chance of failure. When those who follow the Executive Order approach analyze casing standards, they try to optimize the balance of the total benefits and costs. Avoiding

¹² We thus have a contractualist justification of one of the central tenets of the Wingspread Statement on the Precautionary Principle: "The process of applying the Precautionary Principle must be open, informed and democratic and must include potentially affected parties."

great expense can be a reason for taking fewer precautions than we might. But when we switch to the contractualist approach of finding regulations that insure everyone no person can expect to be harmed, it is not the balance of the total costs and benefits that matters, but the balance for each person individually. As a result, the benefits that will go to companies, their investors and their consumers of lower well construction prices will not enter into the equation of the optimal level of well safety from the perspective of the most vulnerable. Since the most vulnerable will typically not receive these benefits, these benefits cannot offset the increased risk from looser standards. The level of safety that would be needed in order to warrant the consent of the most vulnerable is thus likely to be higher than that needed in order to produce a net benefit overall.

This contractualist result dovetails with the intuition of many Precautionary Principle advocates that the Executive Order approach is insufficiently cautious. We thus have succeeded in giving a contractualist justification of one of their core commitments. The second path to legitimate of risk imposition that contractualism gives regulators – namely, regulating in ways that increase the expected benefits to the vulnerable – is less familiar. Given the analysis so far, though, it is no less warranted. And for theoretical purposes it is crucial. While increased safety may be sufficient to make me an expected winner from fracking, we still have the problem of the Amish. Passenger air travel, for instance, exposes them to a risk of death (from falling planes), but they stand to gain nothing at all from it. It is impossible for regulators to issue safety regulations that would eliminate the risk of plane crashes altogether. So, if increased safety were the only tool available to regulators, passenger air travel would have to have negative expected value for the Amish: they will gain nothing, and stand some chance of being harmed. The contractualist regulator, it seems, would still be committed to prohibiting passenger air travel altogether.¹³

The problem vanishes, though, once we recognize that the regulators can do more than mandate safety measures. They can also create rules that shift benefits of the activity to those who would otherwise be expected to lose. This means that prohibiting a risky activity is not the only way to

¹³ This is Elizabeth Ashford's conclusion. In her words, "for many ... activities, not all of those who face the remote risk of being killed by the activity could have expected to benefit from it. Forgoing all activities of [this] kind could significantly impoverish agents' lives. However, as long as their lives would still be well worth living, then the cost to each of them of the extensive burden of avoiding the risk would be less than the cost to another individual of actually being killed by the activity. Therefore, measures which reduced the extremely remote risk of death to a few individuals would be justified even if they severely impoverished the lives of millions." Ashford (2003), 299-300. The problem is also discussed in Lenman (2008) and Fried (2012).

protect those for whom – no matter how many safeguards are mandated – it will still have expected disvalue. Instead, regulators can require, as a condition of engaging in risky activity, that the risk-imposers redirect some of the benefits to these people so that they would not be expected to lose overall. And while this will require them to do more for those who are exposed to risks than the Executive Order approach would, this need not be unduly burdensome.

The basic idea of increasing the expected benefits of an activity for the expected losers of socially beneficial activities is straightforward: the expected winners must provide some benefit to the expected losers that outweighs the risks they will be subject to. Exactly what this will entail in any given case will depend on the particulars, but it is hard to imagine a case in which it won't be possible. Even in the case of the Amish – who, after all, could benefit from lower tax rates, increased access to medical care, or more support for their schools – it is not difficult to imagine how taxes on air travel could be used in ways that offset the tiny expected cost to them of our allowing others to fly in planes. And once they are among the expected winners of air travel, they no longer present an obstacle to its permissibility from the contractualist perspective. Once contractualists shift to the *ex ante* perspective and recognize that shifting some of the benefits of a risky activity allows us to change its expected value for individuals, what has been considered a serious theoretical problem for contractualists is eminently solvable.

Translating this theoretical point into the regulatory context: in addition to requiring safeguards that go beyond what would be justified on a cost-benefit basis, contractualist regulators can require that some portion of the benefits of a proposed risky activity be shifted towards those who would otherwise be expected to be harmed by it. It is worth noting the variety of ways this might be accomplished. One way is the way we just handled the problem of Amish and air travel: redirect some of the profits to all who are expected losers under the Executive Order approach at the time that the risks are imposed on them. In our hydraulic fracturing example, this might involve direct cash payments from the gas companies to the members of the communities in which the fracking is to occur. Or, less directly, it might involve contributions to public institutions that benefit those people. In this case, all those who stand to lose otherwise receive additional benefits to offset the additional risks they run.¹⁴

Alternatively, regulators could take steps at the time the risks are run to guarantee that any of those among the vulnerable who are later made worse off by the activity receive benefits that at least partly offset those losses.¹⁵ The prospect of receiving such benefits if worst comes to worst

¹⁴ Some merits of such a system are discussed in Lin (2005)

¹⁵ In the rare cases in which people who stand to gain nothing at all from an activity are exposed to risks of near instantaneous death, benefits

can increase the expected value of the activity for a person beforehand. Tort law is one standard mechanism for directing benefits to those who are harmed by a risky activity: when victims successfully sue for damages, the risk-imposer is compelled to give some of the benefits that they reaped to those who were harmed. But for the purposes of shifting benefits to the vulnerable from the ex ante perspective, tort law has its weaknesses. One major weakness is that in many jurisdictions, a plaintiff must demonstrate that the risk-imposer was at fault in order to merit payment, usually by showing that the risk was imposed negligently. The problem with such fault-based tort systems in the current context is that many of the possible harms that can make the expected value of an activity negative for some can arise without any negligence at all. In the fracking case, for instance, many are concerned with pollution that might be produced even if gas companies comply with whatever regulations are in place. Since risk-imposers wouldn't be liable for such pollution in a fault-based system, the existence of such a tort system wouldn't help offset the expected disvalue of the harms it could cause.

One response to this limitation would be for regulators to stipulate that risk-imposers will be liable for harms associated with their activity whether or not they were negligent, essentially holding them to what legal scholars call a 'strict' liability standard. Thus even if a gas company were to follow all the safety practices mandated by regulation, they would still be required to pay for the damages their fracking caused.¹⁶ Under such a regime, the payments owed victims would not necessarily be compensation for wrongdoing. Instead they would often be like the compensation property owners receive when tenants non-negligently damage their property and the property owner withholds some of the tenants' security deposit.

The ex ante institution of strict liability would clearly do more than a fault-based system to shift the expected benefits of risky activities in favor of the most vulnerable. But there are still concerns. One is that victims will only collect their payments if the risk-imposer still exists and has sufficient resources to pay them. The more risky the activity, however, the more likely it is that the imposer won't be capable of paying. Riskier activities are more likely to create harms, and the more harms are created, the more likely it is that a firm's liability will outrun its financial resources. Moreover, businesses have sometimes strategically 'spun-off' those parts of themselves that can be held liable so as to reduce their overall exposure, thus again making it more likely that victims will be unable to actually get the damage

delivered after the loss is suffered will not be able to make the expected value positive, for obvious reasons. There direct ex ante transfers may be necessary to legitimize the risk imposition.

¹⁶ Reeves (2104) gives a broadly Rawlsian argument for holding companies strictly liable for harms generated by especially risky activities, even retroactively.

awards that they are entitled to.¹⁷ All of this serves to limit the expected benefits such a strict-liability scheme can provide.

One way to mitigate the chances of this kind of default – and thereby increase the expected benefits for the vulnerable – would be for regulators to require risk-imposers to contribute in advance to a fund for future victims in proportion to the amount of risk they impose. For instance, those who regulate hydraulic fracturing could establish a trust from such contributions that would be responsible for compensating those who are harmed by non-negligent well-drilling as well as those victims of negligent drilling who were unable to get compensated through a fault-based tort suit. In essence, this would function as an insurance program for the vulnerable with the premiums paid for by the risk-imposers.¹⁸

Exactly how much expected benefit this insurance will provide will be a function of how big the fund is: the smaller the fund, the greater the chances are that the legitimate claims will exceed the available resources. Regulators could, of course, address this problem by increasing the size of the fund so that it would have the resources to compensate victims even if the worst-case scenario were to materialize. This could raise the worry that requiring companies to pay such high premiums would render certain socially desirable risky activities financially unfeasible. But there may be ways around even this potential problem. Regulators could, for instance, collect the premiums in the form of requiring companies to buy bonds whose purchase price would total the expected damages under a worst-case scenario. The value of the bonds at the time of redemption would be their purchase price minus the amount that had actually been paid out to victims plus interest. Companies would then be free to sell these bonds on an open market. This would mean that the regulators would have all the money on hand were the worst-case scenario to arise, but would refund any unused funds to the bond-holders when the bonds came due. Since the bonds would have some value on the market, however, companies' net out-of-pocket expenses would be significantly less than if they were to receive nothing in exchange for their contributions to the compensation fund.¹⁹

Surely creative regulators could devise even more instruments for shifting some of the benefits from the risk-imposers to those who would be expected to lose under regulatory schemes justified by expected value maximization. My point here has simply been to show that there is a relatively wide variety of strategies available. This is important because it shows that settling on the precautionary regulation contractualists would

¹⁷ Strand (1983) and Lin (2005) lay out further barriers to recouping damages for environmental injury in ex post tort systems.

¹⁸ New Zealand has instituted just such a scheme as an alternative to tort law for accidental harms.

¹⁹ This alternative is inspired by Tideman and Plassmann (2010).

recommend in any particular case will be a complicated affair. The overall standard is straightforward: governments should be cautious enough to insure that risky activity is conducted only in ways whose expected value for each of us is not negative. But how to achieve this result in practice will be a matter of deciding on what suite of safety-enhancing and benefit-transferring rules can best accomplish this goal.

Before concluding, I'd like to address some concerns that might arise regarding this analysis. The first is that while we have made progress in terms of regulatory justice compared to the Executive Order approach, we may not have gone far enough. Redirecting benefits, we have said, is a way of making risk imposition permissible, and it is in general easier to do this in poor communities. This is so for a variety of reasons familiar from the environmental justice literature, but the diminishing marginal utility of money is chief among them. Each additional dollar typically does more to shift the expected benefits in favor of a poor person than it would to shift them in favor of a rich person. Since it will be easier to shift sufficient benefits to poor people, then we should expect that more risks will be imposed on them than on wealthy people. And this will only exacerbate injustice, for many poor people are poor because of past patterns of discrimination and mistreatment.

In thinking through this charge, we should remember that, on the approach recommended here, when a new risk is legitimately imposed on those who suffer due to historical injustices, they cannot be expected to be worse off from it, and indeed will often be made better off. The whole point of the contractualist case is that those who would otherwise be likely to lose from an activity deserve special protection. But it must be allowed that the historical injustices that explain why some of the poor are poor have not been part of the moral analysis of risk regulation so far. As a result, the analysis is blind to how past injustice should effect what regulatory bodies should decide.

In response, I think the contractualist should acknowledge both this blindness and the moral importance of historical injustices, but insist that this does not detract from this account of the ethics of regulating risk. They can do this by insisting that historical injustices generate entitlements to some degree of preferential treatment in the distribution of resources (or whatever it is that distributional justice distributes), but that these claims pertain to the distribution of resources overall, not to each thing that a government has the power to distribute. In some policy decisions, it may be expedient to advance the goal of corrective redistribution by privileging those who have historical entitlements, in other cases not. On this view, there is the question internal to a regulatory agency of what the permissible ways of conducting an activity are – this is the question that this paper has tried to help answer. And then there is the further question of whether and how the government as a whole should use its authority concerning the activity to further its goal of rectifying historical injustice.

This is a separate question: valid and morally important, but separate in scope and content nonetheless.²⁰

But what about the idea of providing people with money, goods or services to “offset” exposing them to what may kill them or make them sick? Isn’t that the kind of idea typical of the cost-benefit component of the Executive Order approach that we should have expected contractualism to provide an alternative to? The quick answer is no, it is not. Contractualism’s central objection to cost-benefit analysis is to the idea that harms to some could be morally offset by benefits (financial or otherwise) to others. The general idea at issue here, that harms to a person of one kind generated by an activity can be offset by benefits to the same person of some other kind generated by that activity, is shared by consequentialists, contractualists, and, indeed, at least implicitly by nearly everyone.

Perhaps, though, the worry is more specific. While a person’s offsetting a loss in comfort with a gain in adventure makes sense, the analysis here seems to trade on the more specific idea that monetary payments can offset the badness of death. We should be careful, though, to keep in mind that we are really talking about risks of death considered when they are run. And the idea of an increased risk of death being offset by some financial advantage is far less controversial than the idea of ‘compensating’ the dead with dollars. As anyone who has driven further in order to pay a lower price for a product, or who has flown in order to interview for a job with a better salary must agree, trading safety for money is sometimes to one’s advantage.

So, those who find the spirit of the precautionary principle compelling can find support for their intuitions in contractualism. On the interpretation I have defended here, this family of nonconsequentialist theories implies that regulators should be more cautious about permitting risky activities than would be the case if they were to decide using standard risk-cost-benefit analysis. In particular, it implies that they should permit risky activities only when they can issue rules that increase safety or distribute profits in such a way that there is no one who should expect to lose from them. And this result is morally plausible, practically feasible and more precautionary than the utility-maximizing approach that currently enjoys such theoretical and practical prominence.

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²⁰ Caney (2012) develops a similar point in the context of climate policy.

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