

Five Type of Risky Situation

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Introduction

In this paper I attempt to contribute to the debate concerning public safety and the regulation of risk by distinguishing five paradigm types of risky situation. The classification is derived analytically, developing work of H el ene Hermansson and Sven Ove Hansson.¹ It is suggested that situations falling into some categories are inherently more troubling than those falling into others, and thus in greater need of regulation. However, where successful, regulation transforms a situation from belonging to one category to another, and in doing so reduces the ethical difficulties with the imposition of risk. In fact, it will be argued, many of the risks of ordinary life can be analysed as having been transformed in such a way. Unfortunately, however, the approach does not solve the most difficult cases; those often arising from significant technological developments, which pose unquantifiable but possibly catastrophic risks.

Slam Door Carriages

Before introducing the classification of cases, it will be helpful to start by considering some of the problems in the regulation of risk, and to do so I will begin with a case study: the phasing out of trains with slam door carriages, which is to say doors that could be opened from inside the train, at any time, by passengers. In the late 70's I was for a while a daily commuter between Bromley South and Holborn Viaduct. As we approached the station we commuters would stand by each door, and while the train was still moving we would open the window, unlock the door from the outside

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¹ H el ene Hermansson and Sven Ove Hansson, 'A Three-Party Model Tool For Ethical Risk Analysis', *Risk Management* (2007) 9, 129-144.

and hold tight until the train slowed to walking speed. Then we would let the door swing open and jump off the moving train, and thereby get to our desks around five seconds earlier than otherwise we would have done.

Over time these carriages disappeared. Some carriages were modified so that the doors couldn't be opened until the train had stopped, and others were replaced, although it wasn't until a few years ago that the last were taken out of service. Many of these carriages were scrapped before the end of their planned life. The problem, of course, was that they had a poor safety record. Some people opened the doors when the train was traveling at high speed. As recently as 2002 the BBC reported that a student had died when falling from a train at 60mph in a tunnel.² It appears that although the carriage had been modified so that the doors didn't open, the windows still did, and somehow the student fell from the window. Slam door trains were associated with several deaths every year. Some commuters let the door open too early and fell. In other very unfortunate cases the door swung open and caught someone standing innocently on the platform. And it also appears that these carriages were far less able to withstand accidents than later designs. It was estimated that removing all slam door carriages would save between five and ten lives, and many injuries, a year.

The question for the safety experts was whether slam door carriages should be replaced even if they had not reached the end of their normal operational life. Some people will argue that they are so dangerous that they should have been replaced as soon as alternatives became available. On this view there is an absolute duty of care to railway passengers. Others will argue that no decision can be made until we know what it costs to make the replacement. These calculations were done, and it was found that replacing the carriages would be a very significant expense, costing several million pounds for each life saved.³ Would this be money well spent? It is, of course, possible to adopt what became known as the Prescott principle. Immediately after the

² <http://news.bbc.co.uk/1/hi/england/2191416.stm> Viewed August 2nd 2010.

³ Andrew Sharpe, 'Safety Decision Making for the Railway' in *Practical Elements of Safety: Proceedings of the Twelfth Safety-critical Systems Symposium, Birmingham, UK, 17-19 February 2004* ed. Felix Redmill and Tom Anderson (London: Springer 2004), 90-102.

Ladbroke Grove accident in 1999, at a time when it was thought that there were perhaps 70 dead (although it soon turned out that the actual number was 31 dead with over 500 injured) John Prescott is reported to have said to the BBC that cost would not be a consideration in implementing new safety systems, although he was not entirely clear about who should bear the cost.⁴

Suppose phasing out slam door trains would save lives at the cost of £10 million for every life saved. Would this be money well spent? The economists' view, in general, was that if you have £10million to spend, and you want to save some lives, you can do a lot better than spending it on railway safety to save one. For example, in road safety, the official policy is that if a safety improvement can be expected to save a life, and will cost £1.3-4 million or less it is worth introducing. In fact budgets are rather limited and it was reported to me by an official that the department of transport can rarely afford to spend more than a few hundred thousand pounds to make a safety improvement that could be expected to save a life. Consequently for £10million we could save perhaps thirty lives on the road, probably dozens through the health service and perhaps thousands through overseas aid. If you have £10million and want to save lives, just about the least efficient way of spending it is to improve railway safety. According to this way of looking at things, to understand whether or not to introduce a safety measure we must conduct a cost-benefit analysis, and in this case the benefits did not justify the costs. Nevertheless, the programme of early phasing out of slam door trains went ahead.

Was that the wrong thing to do? The argument that it was a misuse of money can sound compelling. But imagine you are the economist advising the industry not to phase out slam door trains, because of the cost. The next day a child is killed by a door flying loose when the train comes into a station. The child's distraught mother is interviewed on the BBC. She says 'I just don't understand it. We know that these carriages are unsafe. We could easily replace them. How many more children will have to die, before we do the right thing and get rid of these deathtraps?' It seems to

⁴ http://news.bbc.co.uk/1/hi/talking_point/467872.stm
Viewed August 2nd, 2010.

me that even the best-trained economist might feel tempted to tear up the cost-benefit analysis and agree.

What is so interesting here is that each of us seems likely to be gripped by two different patterns of moral reasoning that lead in a compelling way to conflicting conclusions. Cost-benefit analysis assumes a consequentialist moral framework in which there is a moral duty to achieve the greatest benefits within available resources, and appears to instruct us to divert money away from railway safety to other areas. On this view we are already spending far too much and should reduce the safety budget for the railways. This contrasts with a type of moral absolutism in which if we know how to prevent death we should do it without considering the cost. In the philosophy textbooks it is common to pose the tribe of consequentialists against the tribe of absolutists, but I think it is likely in this case that we all individually feel torn between the two standpoints. What should we do? I'll come back to that question towards the end of this paper, which is not to say that I can resolve all important questions.

So far we have looked only at one example, in which risk is a negative, to be avoided in order to improve safety. Yet it is clear that sometimes we seem to want to encourage risk. If business is risk averse then, we think, this is bad for economy and hence, ultimately, for all of us. If we are too worried about risk then our children will live dull, sedentary lives, and we ourselves may also cut ourselves off from challenging, exciting opportunities. Risk is a positive, both in that it can lead to individual and social reward and it can be exciting or invigorating in itself. Of course it can be taken to extremes. I had a friend who only got pleasure from gambling at horse races if he staked his train fare home. And of course he didn't always win. But the main point is that situations differ, and what is true about one case, and the need to avoid risk, may not be true about another. Generalisation about the need to avoid risk, or the need to encourage it, are unhelpful.

Classifying Cases

It is important, then, to classify different cases. There are many ways in which this could be done but I want to take my lead from the observation made by two Swedish philosophers that generally there are three roles in any situation of risk. First, there is

the question of who bears the possible costs? Second, who reaps the possible benefits? And third, who decides whether the risk is taken?⁵ This is one of those insights that is so obvious, once you hear it, that you are sure that you must have had the thought yourself before. Only you probably have not. But whether or not the idea is familiar, it opens up the topic for us.

The simplest situation is one in which one party occupies all three roles. Take, for example, the situation where you are offered medical advice. You are given the option of a medical procedure, which, if successful, will improve your quality of life. If it goes wrong then you will suffer, perhaps even die. So you, as an individual, will reap any benefits but also bear the costs, both of having the operation and of not having it. And it is your decision whether or not to go ahead. In this case, then, all three roles - decision-maker, possible beneficiary, and possible loss-maker, are occupied by the same person. This type we can call 'individualism'.

Immediately, I am sure, it will be said that it is not as simple as this. The costs of one person's death spreads to others, and, with luck, so do the benefits of their remaining alive. And, of course, whether the operation happens depends on whether a surgeon is prepared to perform it, and whether the regulators have given approval to that type of procedure. Indeed, in a sense the government is always at least a silent decision-making partner; in the limit case deeming that this is the sort of situation that individuals can decide for themselves without supervision from government.

In real life cases will be complex. I doubt that there will be any pure cases. But real life cases will resemble some pure cases more than they resemble others, and this will help us guide our ethical reflection about them. So there is reason, to begin with, to concentrate on pure cases; we will return to the complexities shortly. We have noted, then, that it is possible for all three roles to be occupied by one party. Consider now a different case, where the costs and benefits will fall on or accrue to one party, but another party makes a decision about whether the risk can be run, or at least the circumstances in which it can be run. Consider, for example, the case of whether motor-cycle helmets should be compulsory. Now it could easily be argued that how to

⁵ Hermansson and Hansson op cit.

balance the enjoyment of wind through one's hair against the cost of near certain death in a high-speed accident is entirely up to the individual and therefore this should be another case where the decision, benefits and costs should be concentrated in one individual. But this is not how governments now see it, of course, and they will not allow individuals to run this risk. Rather they require a certain level of safety that probably reduces the pleasure to a small degree but increases safety to what they hope will be a significant one. This makes the case, in part at least, one, where one party decides whether or not a risk is to be taken, but another party suffers the costs and receives the benefits. If the first case is a triumph of individualism, this one, obviously enough, is paternalism.

Again, though, there are complications. First, the classification of the case as one where the costs fall only on the individual can be contested. Once we have a system of national health care then medical costs are spread out over the population as a whole, and so it is no longer true that anyone takes risks just for themselves. Note, though, that if this is intended as a reason for saying that costs to others justify intervention then in this case the argument backfires. In calculating the cost of accidents the department of transport has a category of 'ambulance and medical costs' which are less than £1,000 for a death and more than £13,000 for a serious injury. If it is NHS costs we are worried out it appears that we should discourage the use of motor-cycle helmets. But presumably this is not our primary concern.

A quite different issue has been pointed out with great force by John Adams: the difficulty regulators may have in trying to improve individual safety in cases where individuals have a measure of freedom of action. People will adapt to a changing environment. For example, Adams has suggested that cyclists wearing helmets feel safer and will take more risks. If this is right you may be more likely to survive a cycle accident if you are wearing a helmet, but you are also more likely to be in an accident in the first place. Similarly, Adams has argued, we cannot tell whether banning motor cycles would reduce deaths. Everything depends on what the motor-cyclists would do instead. If, he says, they spend their new free time taking tea with their grandmothers then indeed deaths would go down. But if they found other ways

of getting their adrenaline fix, who knows?⁶ But perhaps his most notorious observation is that if we are very concerned to make people drive more safely then we ought to stop making cars safer. Rather we should make them very dangerous. Instead of airbags, we should have spikes sticking out of the middle of the steering wheel.⁷ The you'd drive carefully.

More broadly, Adams has posited the theory of risk compensation – we are each comfortable with a certain level of risk, and as our environment becomes safer we become more adventurous in our behaviour. To illustrate, Adams uses the image of a 'risk thermostat'. There is a level of risk we will each tolerate and so as the environment changes we change our behaviour to remain broadly at the same level of risk, if we can. This, of course, is an empirical claim, and I don't know what the current state of evidence is. But it should certainly make regulators pause for thought.

To return to the main line, we have considered two 'ideal type cases' – individualism and paternalism. I now want to introduce a third case, perhaps of more theoretical than practical interest. This is a case where one party makes the decision and takes the risk of loss while another gains any benefit. If the last case was called 'paternalism', we might coin a new term, 'maternalism' for this, for it resembles the sacrificing behaviour often taken by a mother for her children (although of course just as paternalism is not restricted to fathers, maternalism is not restricted to mothers). Outside the domestic sphere, arguably another case is where a government offers trade guarantees, underwriting any possible loss. Indeed the behaviour of any guarantor may well fall into this category.

Broadly maternalism seems ethically untroubling, but the next case, 'externalities' is rather different. Here the party that stands to benefit also makes the decision about whether the risk is run, but others bear the cost. For obvious reasons this is a very dangerous situation, for if one reaps only the positive, and not the negative, consequences of risk it encourages reckless or self-serving risk-taking. Such situations should ring alarm bells. And, indeed, some analyses of the recent financial crisis can be seen as pointing exactly to this structure. Somehow individuals working in banks

⁶ John Adams, *Risk* (London: UCL Press, 1995), p. 23.

⁷ Adams, *op cit*, p. 143.

and other financial institutions managed to place themselves in a situation where they could reap the benefits from very risky behaviour, but, at least in many cases, they were personally insulated against many of the most severe costs. This same structure is the bugbear of the insurance industry, where it is known as ‘moral hazard’. If people are protected against loss, they have far less reason to avoid risky behaviour, especially if that behaviour benefits them in some ways. Consequently the insurance industry has devised mechanisms that spread at least part of the loss to those who can control whether the risk is taken, to try to make them more cautious: this, of course, is the role of a no claims bonus, or excess on a policy. In economic terms, this is the science of ‘incentive compatibility’, ensuring that people have individual incentives to do the socially right thing; an issue, incidentally, now spreading into health policy.

The case of externalities, where the decision maker can potentially benefit from the decision with any possible losses falling on others, comes up in unexpected places. It can arise in the negative case too, where the decision maker refuses to allow a risk, or risks of a certain category, to take place because he or she benefits from the current situation. Take one of the early decisions concerning road safety; the passing of the Locomotives Act, also known as the red flag act, in 1865. This set a speed limit of 2mph in town (4mph in the countryside) for any motorized vehicle, and required a crew of three people, including one walking 60 yards ahead waving a red flag, so as not to frighten the horses. This was a very sensible policy for huge agricultural vehicles on the roads, but it applied to all motor vehicles, however small or light. In 1878 a new act was passed, which removed the need for the red flag, but not the man walking ahead of the vehicle. The basic provisions remained in force until 1896, when a class of vehicles weighing less than 3 tons were exempted and subjected to a speed limit of 12 mph.

According to one writer, this very conservative approach to safety was highly detrimental to the development of the motor industry in Britain, whereas France, with much lighter regulation, forged ahead. He writes:

Why had Victorian Britain been so hostile to the motor car? Why did legislation so deliberately handicap the use of horseless carriages of the road? Was it, as has been suggested, that Britain was a nation of horse lovers that

could not bear to see that ‘noble’ animal supplanted? It was not. ... The real reason for keeping the self-propelled vehicle at bay was that a very large and influential number of the people’s representatives in Parliament had taken the trouble to acquire financial interests in the railways ... Members of both Houses waded wallet-deep in [this very lucrative business]. Road transport could have ruined their fortunes.⁸

If this allegation is correct then in this case, and in others, not only do the decision makers have a stake in the decision going one way rather than another, they may well have done as much as they could to disguise or hide that fact. Very superficially, hiding the benefits is perplexing if cost-benefit analysis is to be our method of deciding whether to go ahead. After all the more benefits there are, the more likely it is that they will outweigh the costs. But there are two very important responses to this. First, it seems we are not indifferent to how the costs and benefits are distributed. Second, if a decision maker will benefit from a decision we are much less likely to trust them to have come to a full appreciation of the costs, for they have reason not to be objective or impartial. Informed risk decision-making requires a risk analysis. And where the decision maker has a stake in the outcome – whether positive or negative – we have reason to distrust their analysis and therefore reasons to want the roles separated. The distorting effect of self-interest makes us suspect that something will go wrong in cases where the decision maker has a one-sided interest in the outcome. This all seems very obvious. Yet its application to the regulation of risk is far from straightforward.

Why is that? The obvious response to an ‘externalities’ case where the decision-maker reaps benefits but not costs is two-fold: supervise the decision maker with another party – a regulator - who has no stake in the decision, and make the party who benefits also share in any potential risk or loss. By these means we reduce the danger by reducing decision making power and changing the incentives for action. But note that doing this is to introduce an element of paternalism into the situation. And we have already observed that, at least in some cases, paternalism can be ineffective as a

⁸ L.J.K. Setright *Drive On!* (London: Granta, p. 13-14.)

way of obtaining desired outcomes. Adams used the notion of a 'risk thermostat' to illustrate the idea that each of us is prepared to live with a certain level of risk in our lives and will adjust our behaviour according. If that is right, we need to ask whether there is also a 'selfishness thermostat' that works in the same way. As regulators change the environment so that some types of self-seeking, exploitative behaviour become impossible or more difficult, then the self-seeking may well look for other ways – weaknesses in regulation elsewhere – that will allow them to pursue their self-interest at the risk of others and not themselves.

As an example, anyone who has employed an electrician lately in the UK may have noticed that the price has risen above what it was a few years ago. Why? In 2004 the daughter of then MP Jenny Tonge was electrocuted, and very sadly died, as a result of poor wiring in her kitchen. As a result the government introduced regulations that requires anyone conducting electrical work to have obtained a safety certificate. An electrician I spoke to about this claimed that all the respectable, high quality, electricians have obtained the qualification, at extra expense that they pass on to the customer, while those electricians who were prepared to do shoddy and dangerous work are also prepared to lie to customers about having the certificate. His claim was that the regulation has made high quality work more expensive for customers and has made the world more dangerous by making unsafe electricians more economically competitive. The main beneficiaries, he claimed, are those contracted to supply training courses. He may be wrong about this, but it is a position we need to take seriously.

Outside the risk context the 'selfishness thermostat' is seen most commonly in financial affairs, such as taxation. As one loophole is closed, lawyers and accountants go back to look for others. In the current context several commentators have said that attempting to prevent future financial crises by regulation is impossible; traders will find other situations in which they can generate gains for themselves by placing the greater risk on others who are unaware of the risks they are running. I don't know if this is correct, but it is certainly a danger, and a challenge for regulators. In general those who write regulations have much less personally at stake than those who are bound by them, and so it is an uneven struggle from the start. In effect those who try to find ways round regulations are looking to continue to operate at a level of

selfishness with which they are comfortable. The challenge for regulators is to make this impossible.

Finally, we must discuss cases where the three roles are distributed among three parties. Common cases would be where a decision is made by government to allow one party to proceed with a course of action which has risks, but no benefits, for another. This we could call ‘adjudication’, and this case completes our taxonomy of pure cases, as illustrated in the table, although as we have seen there will also be hybrid or impure cases:

		Party suffering cost	Party enjoying benefit	Party making decision
1	Individualism	A	A	A
2	Paternalism	A	A	B
3	Maternalism	A	B	A
4	Externalities	A	B	B
5	Adjudication	A	B	C

A simple example of adjudication would be your local government granting someone else planning permission to build on the plot next to your house. Here you bear risk and do not gain, another party stands to gain, and a third party makes the decision (at least in part). Once again such cases are not pure as the party that hopes to benefit does bear some risk, but the salient point is that the person living next door to the building site bears risk of uncompensated loss, through noise and disruption and perhaps subsequent reduced enjoyment of their own property, and benefits directly little if at all, and has very limited say in this decision. With this description, it may be hard to see why such practices are allowed.

The obvious answer, of course, is that it forms part of a pattern of behaviour from which we all can reasonably expect to benefit over time, even if in particular cases we might lose out. It is against such a background that cost-benefit analysis comes into its own. While it is easy to point out the apparent injustice of a decision that benefits some at the cost of another, if this is part of a larger pattern by which we all sometimes benefit and all sometimes lose, then, under the right circumstances we can all be better off when cost-benefit analysis is used and projects are allowed whenever their benefits outweigh costs. However, these conditions are rather restrictive. In one type of case in which the cost-benefit approach seems unobjectionable, three conditions need to be met. First, we need to be assured that this is a situation of a type that is very likely to re-occur, as in the case of planning permission. For otherwise it cannot be claimed that the situation in question falls into part of a pattern from which all benefit over time. Second, in this ongoing series everyone must have the chance of being a winner in some decisions as well as a loser in others, and the distribution of chances must be fair. For if one party frequently loses and the other frequently wins then it can no longer be said that we are all better off as a result of the practice. Finally, normally it is important that the possible loss is limited. For if the risk is too great then those who lose who will not be around to reap the benefits next time round. Ideally, then, this final condition is read to exclude very high costs, such as extreme financial loss or death; anything that puts you out of the game.⁹

However this last condition needs to be modified in the case of decisions involving risk, for the cost-benefit analysis as used in safety policy clearly does trade-off risks of death. Here we need to return to the problem we started with: isn't one death too many? How can we put a price on life? The accepted position now within the risk literature is that this is really the wrong the way to think about the issue. When we introduce a safety improvement we are reducing risk for everyone. We are not saving the life of any identified person but making the world a little bit safer for a wide number of people. Of course the consequence of this is that fewer people will die, but what we are valuing is not life but the aggregated risk reduction for many people. Seeing it this way makes finding a financial value far less problematic. For spending money on safety improvements, such as a better cycle helmet, is an ordinary part of

⁹ Jonathan Wolff, 'Making the World Safe for Utilitarianism' *Philosophy* (Supplement) (2006) 81, pp. 1-22.

life. Talking about the ‘value of life’ is an awkward shorthand for the aggregated value of many small risk reductions. Hence in putting a financial value of safety we are not valuing life. This should make us more comfortable with a cost-benefit analysis.¹⁰

Routine and Non-Routine Risks

But it does not at all follow from what has been said that we need to accept all levels of risk, provided that there are compensating benefits. For a situation to be fall within the acceptable ‘routine’ range the risks will need to be below a certain magnitude. This, as it happens, fits with current safety policy in the UK. In its guidance document, *Reducing Risk, Protecting People*, the Health and Safety Executive suggests that risks can be thought to fall into three categories; those so trivial as not to need regulation; those so serious as to be avoided other than in the most exceptional circumstances; and those falling in a middle band, which are to be reduced to ‘as low as reasonably practicable’.¹¹ ‘Reasonably’ is of course the key word.

For this middle band cost-benefit analysis seems appropriate, as long as the situation can be seen as one of a kind that falls into a pattern of ‘routine’ cases, which is to say that those who are exposed to higher risk in one case will benefit from other people’s exposure in other cases, and that it turns out broadly fair over time.

What would make the situation ‘non-routine’? The Health and Safety Executive, following work in the psychology of risk, suggest that some situations engage a higher level of concern. These include situations which:

They often give rise to risks which could cause multiple fatalities; where it is difficult for people to estimate intuitively the actual threat; where exposure involves vulnerable groups, eg children; where the risks and benefits tend to be unevenly distributed – for example between groups of people with the result

¹⁰ Jonathan Wolff, ‘What is the Value of Preventing a Fatality?’ in *Risk: Philosophical Perspectives* ed Tim Lewens (London: Routledge, 2007).

¹¹ Health and Safety Executive, *Reducing Risk, Protecting People* (London: HSEBooks Executive, 2001).

that some people bear more of the risks and others less, or through time so that less risk may be borne now and more by some future generation.¹²

Just before this passage the document suggests ‘typical examples relate to nuclear power generation, railway travel, or the genetic modification of organisms.’

Safety experts from the railway industry were not happy that railway travel was put alongside nuclear power and GM crops here, bearing in mind that cases of transport safety are rather mundane and well-known. The only listed feature that clearly singles them out is the possibility of ‘multiple fatality’ incidents. Yet for the last 50 years there probably has not been a week in which more people in the UK died in rail accidents than in road accidents.

Nevertheless, it is true that until just a few years ago – I mean three or four – the railways had a terrible reputation for safety, stirred up by the trade unions who wanted to associate privatization with poor safety and thereby make the case for re-nationalisation, and the quality Sunday newspapers, who found that multi-page semi-scientific analyses of train crashes, with pictures and diagrams, were an excellent way of selling newspapers. But what made railways problematic at the time was not the nature of the risk, but the suspicion that there was something about safety decision making that was going badly wrong. The mantra ‘profits before safety’ was rolled out again and again in criticism of the industry. On one level this was a peculiar accusation as one of the many perplexing features of privatization was that the taxpayer remained liable for the cost of safety improvements. Yet on a smaller scale the accusation of ‘profits before safety’ had some purchase, when what was meant was that pursuit of bonuses on maintenance contracts and avoidance of penalties on late running led individuals to breach official policy.

Here we see again that we become very concerned when we believe that those who make a decision to permit a risk have a financial interest – a vested interest – in the risk being taken, but where any losses consequent on the decision will fall on others.

¹² Health and Safety Executive, *op cit*, p. 12.

We suspect that the decision maker will conduct a faulty risk analysis and base their decision on a distorted account of the evidence, for their own profit.

Arguably, then, railway safety became ‘non-routine’ for a while not because of the nature of the risk, but because of suspicions about vested interests in the micro-risk management process. The other two cases mentioned by the Health and Safety Executive as exceptional - nuclear power and genetically modified organisms – are very different in that they present risks that are very hard to quantify and, on some scenarios, could be catastrophic. This puts us in a position of what economists call ‘decision under uncertainty’ rather than decision under risk, where probabilities and the nature of outcomes are unknown. In such cases cost-benefit analysis is no help. We cannot say whether or not the benefits outweigh the costs if we don’t know what the costs are.

Many people appear to believe that in such cases it is possible to appeal to ‘the precautionary principle’ to deal with such cases. What is this famous principle? There are several versions of it, although this is the version quoted by the Health and Safety Executive, in the version provided by the United Nations Conference on the Environment and Development (UNCED) in 1992. ‘Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent degradation.’¹³

So this is not exactly a principle, but a warning that lack of full scientific certainty is not a good reason for non-action. Which is very sensible as ‘full scientific certainty’ is a very high barrier. The precautionary principle, or approach, is often interpreted as suggesting that we should be very cautious in cases of uncertainty, or where there is a risk. But how cautious? Much appears to depend on how great the benefits are in comparison to apparently safer ways of doing things. But once again we need to distinguish the risk management process from the nature of the risks to which we might be exposed. Is there a hidden agenda, where some benefits and some costs are hidden, in order to make the decision look much more routine and straightforward than it might really be? Here we might compare nuclear power and GM crops. As far

¹³ Health and Safety Executive, *ibid* p. 29.

as I know, now that the debate over nuclear power has matured over the decades, and in contrast to the early years of the debate, there is little suspicion that the ordinary person is only being offered part of the picture by the decision makers. We now know about the possibilities of radiation leaks, catastrophic failure and the problems of nuclear waste. We also know that private companies will make profits from nuclear power, but we also know about limited supplies of, and other problems with, fossil fuels.

In the case of the debate about GM crops, however, there was also great suspicion about the decision making process in that it became widely believed that those advocating the introduction of such crops were hiding salient facts. There were various concerns about intellectual property rights that would be asserted over seeds, and that farmers in the developing world would become trapped into long-term contracts, which would lead to long-term dependence and exploitation with little if any benefit, despite the claims of advocates of GM that it provided the best route to end world hunger. Consequently the issue was doubly mired: first, it was very unclear what the risks were; second, those in the best position to estimate the effects had every reason to mislead. Against this background it is not surprising that the idea of introducing GM crops received a hostile reception. Those who wanted to move the debate on to questions of 'sound science' began to look like, in Karl Marx's memorable phrase about academic economists, 'hired prize fighters for capitalism'.

What, then, can we conclude? I think it is clear that over a wide range of routine cases cost benefit analysis is acceptable in the sense that over time it is likely to make us all better off. In effect we can see isolated cases of risk as part of a larger practice of risk taking in which we all benefit, we all face costs, and we are all part of the decision making process about acceptable levels of risk through the democratic process. In effect, then, we could call this a form of 'collective individualism', in which we all collectively occupy all three roles in the risk situation.

From this it follows that having a more restrictive attitude to risk is likely to make us all worse off in the sense of forsaking valuable activity. But it does not follow that cost benefit analysis is always acceptable. I've here introduced two types of non-routine cases. Sometimes they are non-routine because of the nature of the risk,

especially where the potential costs are very hard to estimate, but possibly very substantial. But sometimes cases are non-routine because of the way the risk is managed. The particular danger case is where the decision maker stands to gain if things go well, and others lose if things go badly. This is especially dangerous if the decision maker is not fully open about the possible benefits, which will lead to reasonable suspicion that there has not been a full declaration of the possible costs.

What makes these situations non-routine is very different and hence quite different responses are needed. Where the danger arises because of management of risk, we need to think about how to take power away from those who benefit from the risk and increase the power of those who may lose, and this is something we may attempt through regulation. But in creating any regulations we need to pay attention to John Adams' risk thermostat and also consider whether an analogous selfishness thermostat exists, for if we ignore such considerations we could end up creating regulation which is both expensive and pointless.

Where the situation is one where it is non-routine because of the nature of the risk, as in nuclear power, it is unlikely that any simple formula that can be applied. Unfortunately the precautionary principle takes us only a very little distance, and to date nothing else has been supplied, as far as I know. It has to be left to judgement and given that the costs and benefits fall on us all there is no substitute for a wide political debate, including lengthy articles with diagrams in the Sunday newspapers.

