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Costs of Inaction on Key Environmental Challenges

Chapter 1

Introduction

When assessing the "costs of inaction" with respect to environmental concerns it is important to first define the meanings of the terms "inaction" and "costs" which are to be applied. This chapter makes the case for the use of an assumption of "no new policies beyond those which currently exist" as the basis for its discussion of "inaction". With respect to "costs" both market and non-market impacts are considered, but it is pointed out that in some cases it is difficult to obtain reliable estimates of the costs of environmental impacts that are not reflected (directly or indirectly) in market prices and national accounts. The criteria used for the selection of the different environmental areas addressed are then discussed.

Introduction

When OECD Environment Ministers met in April 2004, they drew attention to the need for more analysis of the "costs of inaction" (COI) on key environmental challenges. This report is part of the response to that request.

It begins with an overview (Chapter 1) of some of the definitional questions that underlie the notion of "costs of inaction", as well as some of the methodological issues that this concept embodies. Chapters 2 to 5 then summarise the COI literature dealing with selected environmental challenges (Chapter 2 on air and water pollution; Chapter 3 on climate change; Chapter 4 on environmental hazards, accidents, and natural disasters; and Chapter 5 on natural resource management). A few conclusions are offered at the end of the report (Chapter 6).

Defining what is meant by the "costs of inaction" is not straightforward. This paper uses an assumption of "no new policies beyond those which currently exist" as the basis for its discussion of "inaction". With respect to "costs" both market and non-market impacts are considered, but in some cases it is difficult to obtain reliable estimates of the costs of environmental impacts that are not reflected (directly or indirectly) in market prices and national accounts.

Some of these costs are already reflected in household budgets and firms' balance sheets (*e.g.* additional costs to secure increasingly scarce resources; or "defensive" expenditures, aimed at avoiding the impacts of environmental degradation). Similarly, some of the financial costs of inaction are also already reflected directly in public sector budgets (*e.g.* increased public expenditures on health services due to air and water pollution; or cleanup costs at contaminated sites). Other costs may be reflected (at least in part) in existing markets, even though they are not readily perceived as costs of environmental policy inaction *per se* (*e.g.* the effects of environmental degradation on adjacent property prices; or the additional cost of flood insurance in coastal areas). Looking beyond these market-based costs, there are also costs of inaction associated with a wide range of intangibles (*e.g.* pain and suffering from being in ill-health) and various forms of ecosystem degradation. Although less visible, these non-market costs are likely to be important.

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It is important to emphasise that this report does not review the entire (and vast) body of literature on the costs of *inaction*. It is necessarily selective, focusing on a few areas.[1] Moreover, no attempt is made to review the equally vast body of literature on the costs of *action*. In the absence of information about the costs of policy interventions, estimates of the (marginal) costs of inaction on their own cannot be considered as a guide to either the establishment of policy priorities or to overall economic efficiency.

In addition, much of the information presented here is expressed in terms of *total* costs – not *marginal* costs. Although it is only the introduction of policies whose *marginal* benefits are expected to exceed their *marginal* costs that will increase economic efficiency, the underlying premise of this report is that information about the *total* costs of inaction is still of interest, in the sense that it provides a broad indication of the scale of the costs of inaction in various fields of environmental policy.

What do we mean by "costs of inaction"?

Defining "inaction"

All OECD governments have already introduced policies to conserve scarce natural resources and/or preserve environmental quality. Defining policy "inaction" in the context of an area of public policy in which significant strides have already been made is clearly not straightforward. Conceptually, there are at least three possible baselines that could be used to represent "inaction":

- a hypothetical scenario, in which it is assumed that there is *no environmental policy intervention whatsoever*;
- an assumption that *existing environmental policy continues* in its present form and at its present level of stringency; and
- an assumption that credible commitments will be implemented that would *increase the level of environmental policy ambition in the future.*

In specific circumstances, it may be appropriate (and possible) to define some absolute notion of "inaction" along the lines set out in the first bullet above. For example, for a very recently-discovered social "bad", the relevant notion of inaction may be one in which there is no existing policy framework at all. Indeed, the most common use of the term "costs of inaction" used in contemporary policy debates relates to the onset of HIV in developing countries, and this is the notion of "inaction" which is generally applied there (*e.g.* World Bank, 2003).

An analogous situation in the environmental domain might be the discovery of the hole in the ozone layer – a problem that arose from the emission of chlorofluorocarbons and other ozone-depleting substances. When initially discovered in the 1970s, the most appropriate definition of "inaction" may well have been a situation in which there was no relevant policy framework at all in place. No actions had yet been taken to reduce emissions of ozone-depleting substances, except for endogenous actions (by firms), motivated by efforts to reduce production costs or to improve product quality in general.

Arguably, in the work undertaken by the World Bank in the mid–1990s on environmental degradation in developing countries, a similar perspective was adopted – in the sense that this work assessed environmental impacts in countries in which an environmental policy framework was in its very early stages of development. In this context, the damages from "inaction" with respect to air and water pollution in China were reported to have amounted to almost 8% of GDP in 1995 (World Bank, 1997). Similarly, the annual damage cost of environmental degradation in 2000 in Lebanon was estimated to be 3.4% of GDP (close to USD 5 665 million per year). The figure for Tunisia was 2.1% of GDP (nearly USD 440 million in 1999) (World Bank, 2004a).

The second possibility (bullet 2 above) is to start from the "existing policy framework". Thus, a series of studies undertaken by the European Commission on the "costs of non-Europe" (commonly referred to as the "Cecchini Report") (EC, 1998) estimated the cost saving to the European Union economies of removing internal frontier controls within the Union (consisting of 12 member States at the time) at EUR 8 billion. At the time this report was completed, there had already been considerable economic integration among countries, so any approach that ignored this "existing integration" would clearly have been less informative than one which took it into account.

As already mentioned, OECD governments have introduced a wide variety of policies, aimed at preserving environmental quality or conserving natural resources. The continued implementation of these regulations and market-based policies at their existing level of stringency can hardly be characterised as "inaction" in a strict sense, and is perhaps better characterised as "business-as-usual". Nonetheless, adopting such a perspective is likely to be more instructive (and easier to apply) than "assuming away" the existing policy framework.

The third possible definition of "inaction" (bullet 3 above) would involve incorporation of existing commitments to policy reform – commitments which go beyond the existing policy framework. For instance, "inaction" might be assumed to be based upon the commitments that some countries have previously agreed to under the Kyoto Protocol, with respect to climate change – or under the Millennium Development Goals, with respect to water supply and sanitation. Although many countries are likely to fall short of fully achieving these commitments with existing policies, it may be deemed appropriate to adopt a dynamic perspective of policy development – a perspective in which it is assumed that efforts will be made to meet these commitments in future.

The perspective taken in this report is that the most practical and informative perspective to adopt for "inaction" is one in which it is assumed that the existing policy regime (*i.e.* the *status quo*) is kept in place (*i.e.* bullet 2 above). This is consistent with the methodology adopted in the *OECD Environmental Outlook to 2030* (OECD, 2008), in which the baseline modelling scenario assumes that "currently existing policies are maintained, but no new policies are introduced to protect the environment." This has the pragmatic advantage that it gives governments "credit" for actions they have already taken, but not for those they have simply promised (and may never achieve). However, using this definition immediately raises the question of what exactly is embodied in the *status quo* policy framework, and how this can best be modelled in a dynamic context.

Once the "baseline" policy scenario has been defined in general terms, it is then important to assess how economic agents are likely to *respond* dynamically to that scenario. This response will depend in part upon the nature of the policy instrument(s) being implemented within the existing policy. For instance, the retention of an existing cap for tradable emission permits will have very different implications for the costs of inaction than the retention of a given set of performance standards for the same pollutants – even if the underlying environmental objective is the same. A cap and trade system that limits emissions will be unaffected by economic growth rates, firm entry (and exit), and technological innovation. This will not be true of performance standards – at least not without continuous adjustment of the policy measure. Over time, therefore, different policy measures will involve different *scale* and *substitution* effects – both of which will eventually translate into a different shape and location of the "costs of inaction" pathway.

Households and firms are also likely to respond to the changing environmental conditions that they face, and the nature of this adaptation to the state of the existing environment should be reflected in the analysis. It cannot realistically be assumed that those who will be affected by a degrading environment will not adjust their behaviour in the face of that degradation. A corollary applies for cases involving local environmental "bads" (*e.g.* hazardous waste facilities or local air pollution), but where *private* markets are affected by *public* environmental conditions. As environmental conditions change, associated (private) markets will be affected (*e.g.* real estate) and households will adjust. All of this will again affect the shape and location of the costs of inaction.

Defining "costs"

There will also be residual environmental consequences embedded in the "no new policies" assumption that has just been described. There are several different units (or metrics) in which these environmental consequences can be expressed, but the broadest distinction that can be made is between "physical" (ecological, health, etc.) metrics and "monetary" ones. Metrics related to resource exploitation might include measures such as rates of deforestation, rates of water abstraction relative to availability, and assessments of the status of fish stocks. Metrics related to environmental degradation might include emission rates relative to assimilative capacity. Further downstream, impacts on such variables as health, material damages, and resource productivity may also need to be assessed.

The standard procedure for assessing environmental impacts is environmental impact analysis (EIA). In the context of assessment of the costs of inaction, an EIA would measure the various environmental impacts in physical units (which will probably vary from one impact to another). A life-cycle analysis (LCA) amounts to performing an "extended EIA", with environmental impacts being measured across the entire life cycle of the environmental problem in question.

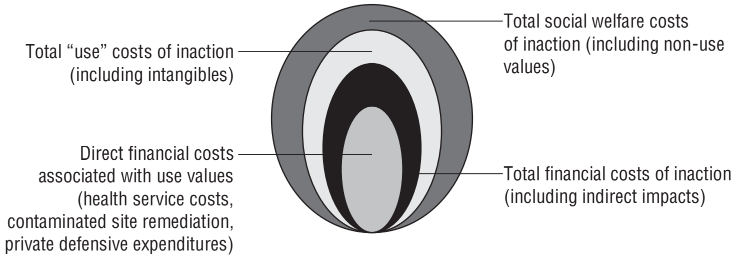
Taking the additional step of estimating the value of these impacts in monetary terms would then lead to two key advantages:

- Different types of impacts associated with inaction can then be compared using a common metric (*i.e.* loss of biodiversity and human health impacts);
- The estimated costs of *inaction* can then be directly compared with the costs of *action* (*i.e.* the benefits of inaction, such as avoided investment and other costs).

However, actually taking this "valuation step" is not easy, mainly because many environmental damages relate to impacts that do not have a market value. Whether because of the existence of externalities or the absence of enforceable property rights, there may be no financial cost associated with resource depletion or environmental quality degradation. Even if there is a market value, this value may not reflect the real economic value: for example, the price of fish in the market may not reflect scarcity rents associated with its capture; the investment and operating costs associated with wastewater treatment plants may not reflect the full social costs associated with pollution.

Figure 1.1 illustrates one way of thinking about this problem. In the innermost circle, the *direct financial costs* of inaction associated with environmental degradation are captured. This might include expenditures on remediation and restoration, private and public health services costs, and

Figure 1.1. **Unbundling the costs of inaction**



private defensive expenditures. Proceeding outward to the next bubble, other more *indirect costs* are included. These capture some of the indirect costs of resource depletion and environmental degradation which are reflected in other associated markets (*i.e.* real estate and labour markets), as well as general equilibrium impacts.[2] In the next bubble, costs associated with the loss of *environmental use values* which are not reflected in markets at all are included. This would include the non-market costs associated with "pain and suffering", as well as some aspects of environmental quality (aesthetics, visibility, etc.) And finally, the last bubble incorporates the loss of *non-use values*, such as existence values, as well as values associated with bequest and altruism.

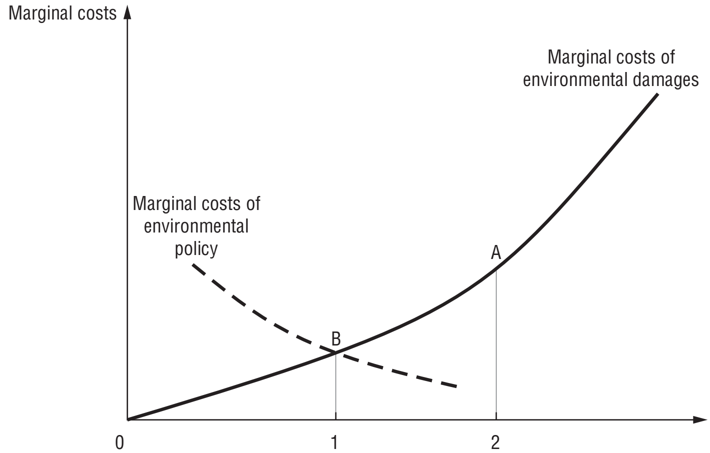
Estimates of the costs of inaction should, in principle, reflect all of these values. Two broad approaches have been developed to resolve the problem of placing a value on environmental assets: *i)* revealed preferences; and *ii)* stated preferences. In the case of *revealed* preferences, efforts are made to derive the value of environmental assets from behaviour in existing markets for "associated" goods and services. For instance, the cost of polluted air may be reflected indirectly in real estate markets. Alternatively, efforts to value environmental assets through *stated* preference techniques posit a hypothetical market, for which respondents are requested to value changes in environmental conditions directly.

Putting it all together: Assessing the total costs of inaction

Figure 1.2 integrates the main elements of the previous discussion, drawing upon the climate change and fisheries examples.[3] "Inaction" has been defined in terms of the "continuation of existing policies". This level of "inaction" will result in a given concentration of greenhouse gases or fish stock at a specific point in time (Line 2 in Figure 1.2).[4]

The marginal costs of environmental damages increase as the ambition level of policy declines (*i.e.* "inaction" increases). This curve intersects with the

Figure 1.2. **Marginal and total costs of inaction**



Climate change	Pre-industrial concentration	Concentration at optimal policy	Concentration at existing policy	Concentration at no policy
Marine fisheries	No fishing effort	Effort with optimal policy	Effort with existing policy	Effort with no policy

line representing policy inaction at Point A – which can be interpreted as the *marginal* costs of inaction. Conversely, the marginal costs of *addressing* the environmental problem rise with the level of policy ambition. In the graph, this is represented as the “decreasing marginal costs of environmental policy” curve, since the level of policy stringency decreases as one moves to the right on the x-axis.[5]

The efficient level of policy stringency is the point where the marginal costs of environmental damages and marginal costs of associated policy interventions intersect (Point B). This level of policy stringency serves as one possible counterfactual to “inaction”, and is assumed here to be more stringent than current policies. A second possible counterfactual would reflect a level of stringency involving no anthropogenic contributions to environmental degradation or resource exploitation (Point 0).

To arrive at a value for the *total* costs of inaction, it is necessary to calculate the area under the “marginal costs of environmental damages” curve, between the points representing “inaction” and the assumed counterfactual. If the comparison is made with the *optimal* level of policy intervention, the total costs of inaction will be represented by the area 1BA2; if the comparison is made with the highest possible level of stringency, the total costs of inaction will be represented by the area OA2.

Criteria for selecting the issues examined in this report

It is not possible here to provide an exhaustive review of the literature on the costs of inaction with respect to *all* environmental policies. The particular issues that are addressed in this report (health impacts of pollution, climate change, environment-related accidents, hazards and disasters, and natural resource management) have been selected for discussion for two main reasons: *i)* taken together, they provide examples of the most common issues which arise when measuring the costs of inaction; and *ii)* they represent particular environmental problems for which political pressure related to "inaction" seems most likely to occur.

For instance, one of the most controversial issues relates to the values that are placed on non-use values (or passive use values). These values can only be estimated using stated preference techniques, because they do not "leave a behavioural trail" (Pearce *et al.* 2006). Obtaining reliable estimates of these impacts will require significant care in eliciting and analysing the preferences of the respondents. One particularly controversial area is the notion of "existence" values – an example of which is the value which respondents place on species preservation, even though they may never derive use benefit from the continued existence of that species.[6] Non-use values are especially relevant for the problem of inaction in the field of *natural resource management*, where impacts on ecosystems and biodiversity can be significant.[7]

Even some use values can be controversial to value. The area of human health is one such case. Estimating the "costs of illness", such as hospital admission costs, medicine costs, and lost productivity is relatively straightforward, at least in principle. However, this will not encompass all the negative impacts associated with health degradation, since important intangible costs (*e.g.* pain and suffering) will be ignored. Even more controversial is the estimation of the value of mortality, as reflected in the estimated value of a statistical life.[8] For both reasons, the inclusion of a discussion of policy inaction related to *health impacts caused by air and water pollution* was seen to be of interest for this report.

Dealing with the very long run adds an additional level of complexity to the "costs of inaction" problem. Carbon dioxide emitted today has an atmospheric lifetime of over 200 years; air pollutants to which people are exposed today can generate adverse health impacts in 50-60 years; over-exploited fish stocks can take decades to recover. Costs today also have a higher value than those borne in the future, both because of "pure time preference" and the "opportunity cost of capital". The further into the future the cost occurs, the lower the weight that will tend to be attached to it. Indeed, the estimated present value of the costs of inaction can vary by orders of magnitude, with even small changes in the discount rate that is applied. Some people even find the practice of discounting morally unacceptable, because it seems to suggest that future costs are less important than present ones – and is therefore unfair to future generations. Temporal considerations such as these lie at the heart of the *climate change* and *natural resource management* issues, so this is another dimension on which this report focuses.

Environmental pressures can also embody complicated non-linear impacts, so any focus on the costs of inaction should embody a closer examination of some of the dynamic issues involved with this non-linearity. Three issues seem to be important in this regard:

- *Cumulative effects:* Some environmental impacts will become significantly greater as a result of cumulative environmental pressures over time. Many *health-related impacts* exhibit such an effect, such as bio-accumulation of hazardous substances in the food chain.
- *Thresholds:* There are numerous areas in which impacts may increase sharply, once a particular level (threshold) of environmental pressure is exceeded. In the area of *climate change*, thermohaline circulation is one example – in effect, there may be a "tipping point", after which an inversion might arise (with significant implications for the total costs of inaction).
- *Irreversibilities:* While some environmental impacts are potentially "reversible" (allowing for the restoration of environmental conditions to their prior state), there are many areas in which this is not the case (once degraded, environmental values are lost permanently). Species loss associated with unsustainable *natural resource management* and *environment-related hazards*, such as soil contamination provide two examples here.

In the presence of such non-linearities, the costs of preventing environmental degradation in the first place (mitigation) will often be less than the costs of addressing the impacts of the environmental problem once it has occurred (restoration). Indeed, for many types of impacts – particularly for those involving irreversibilities – it is not possible at all to restore the environment to its previous state. In these cases, restoration costs will provide a gross underestimate of the costs of inaction. [9]

Uncertainty can also complicate efforts to value the costs of inaction. Uncertainty can relate to the ecosystem which is to be valued. For instance, there may be uncertainty about the effect that a specific pressure (*e.g.* concentrations of CO_2) has on negative environmental impacts (*e.g.* sea level rise). With respect to health impacts, there may also be uncertainty about the links between a specific environmental pressure (*e.g.* particulate matter) and impacts on human health (*e.g.* respiratory problems). There may also be uncertainty about the estimated economic value of the anticipated impacts, even if the physical magnitudes of these impacts themselves are known with

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certainty.[10] And finally, the level of uncertainty is likely to be greater the longer the time horizon over which impacts are to be "costed", with factors such as technological and demographic change being difficult to forecast with precision.

There is therefore considerable uncertainty associated with all stages in the "costing" of the impacts of resource depletion and environmental degradation. It is important to reflect this uncertainty (and risk) in the methodological approach that is adopted, and in the way the results of these studies are communicated. In the presence of significant uncertainty, it is important to assess how much this uncertainty affects the range of possible costs. Depending on the degree of risk aversion that is assumed, the estimated costs of inaction may vary widely.[11]

In methodological terms, at the level of the individual study, it is important to undertake sensitivity analyses in which a broad range of values are applied to those parameters for which there is significant economic or scientific uncertainty. More generally, it may be necessary for policy-makers to draw upon the results of a broad range of models and assessments, since model structure and other factors may be even more important determinants of the estimated costs of inaction than different parameter assumptions.

For some impacts, it may not even be possible to assign credible probabilities to different environmental outcomes. There are some types of potential impacts where "we do not even know what we do not know" (Cole, 2007). In such circumstances, there is a strong case for devoting significant resources toward "investigating seriously the nature of the runaway climate disasters in the thick tails (of the distribution) and what might be done realistically about them" (Weitzman, 2007).

Another important complicating factor associated with evaluating the costs of inaction concerns the treatment of the distributional impacts of environmental degradation. Different types of environmental impact can affect individual countries (and individuals within individual countries) very differently. In some cases, one group of individuals may benefit, while others will bear the costs. Determining the social welfare costs of environmental damages based on estimated individual utility functions ultimately raises basic questions about the weights that are used in the aggregation process.

With decreasing marginal utility of consumption, the distribution of impacts will also affect the aggregate estimate of the costs of inaction. Moreover, there may be good ethical and political reasons (*i.e.* social aversion to inequality) to weight impacts relatively more heavily if they affect poorer households the most.[12] These issues may be particularly relevant in the context of *climate change*. However, social concerns may also relate to specific communities above and beyond distributional implications in terms of income levels. In the area of *natural resource management,* specific concerns of this kind are common (*i.e.* employment in fishing communities).

Summary

There are various possible ways to think about the "costs of inaction". The precise definition to be applied depends on the purpose of the particular study. In turn, the choice of the particular definitions of both "inaction" and "costs" will partly determine the policy use to which the estimates of any particular study can be put. Estimates of the costs of inaction also raise a number of normative issues (including those associated with distributional impacts within and across countries) and analytical issues (discounting, treatment of uncertainty, etc.). In the context of the various case studies which follow, these issues are addressed, where they are particularly pertinent.

Cost estimates for some environmental problems will tend to be more readily available in an aggregated sense; while for others, cost estimates may be more readily available for only subsets of costs. For example, estimates of the overall impacts of climate change (*i.e.* the social cost of carbon) will be more readily available than estimates of the specific costs of climate change with respect to local flooding problems, even though (in principle) the latter is implicit in the former.[13]

From the perspective of a policy-maker concerned with the introduction of new environmental policies, the most appropriate approach will be to think about the marginal social costs and benefits associated with an incremental change in environmental quality, relative to the *status quo* situation (*i.e.* the "counterfactual baseline"). This approach will provide information that can be directly used in decisions about the allocation of scarce resources. However, estimates of the total gross costs of inaction (*i.e.* not the marginal social costs) still have significant value in terms of helping to highlight the economic impacts of not addressing pressing environmental problems. For practical reasons, most of the information provided in the remainder of this report is of the former variety.

Notes

1. For example, the cost of policy inaction with respect to biodiversity is only addressed insofar as such impacts arise out of policy inaction in other areas (*e.g.* fisheries management, climate change) which are addressed in the report.
2. For instance, in the valuation of public service health costs, it is important to take into account the means by which that service is financed. If it is financed through general tax receipts, the costs of inaction will be greater, the more distortionary the existing system of taxation.

3. The figure is the "mirror" image of the more usual representation of policy costs and benefits in which "effort" (*e.g.* abatement or conservation) is increasing from left to right on the x-axis. However, since the focus of this report is on "inaction", the x-axis is reversed.
4. In the case of fisheries, this is an over-simplified representation. Ideally, fisheries policies should target fish stocks, and there is no one-to-one relationship between fishing effort (or "total allowable catch") and the fish stock at a given point in time. This is because the latter will also depend upon past harvest rates and ecological conditions.
5. While the hypothetical curves presented here are continuous, there may actually be important discontinuities (*e.g.* thresholds and irreversibilities), resulting in major changes in estimated impacts (and in the estimated "costs of inaction").
6. "Existence" values are often mistaken for "intrinsic" values. The latter are unrelated to human preferences.
7. The costs of inaction associated with biodiversity are indirectly addressed in this report, via the discussions on groundwater depletion and fisheries management.
8. Objections to estimating the value of a statistical life are common on ethical grounds. However, casual inspection indicates that people will not allocate an infinite amount of resources to reduce a marginal change in risk.
9. Some measures taken to mitigate environmental impacts are also irreversible. Kolstad (1996) found that irreversibility in capital investment to mitigate global warming resulted in a less stringent policy due to the benefits of learning. Pindyck (2007) reached a similar conclusion.
10. There is, of course, also uncertainty with respect to the "costs of action". This can have important implications both for the choice of policy instrument (Roberts and Spence, 1976) for the timing of policy interventions (Pindyck, 2007).
11. Risk and uncertainty are closely associated, but are not identical. "Risk" generally refers to cases in which it is possible to posit probabilities of different outcomes, while "uncertainty" can also reflect cases in which even the set of possible outcomes is unknown.
12. An exposition of the issues involved can be found in Boadway (1976). See also Serret and Johnstone (2006) for a more general discussion of some of the policy implications.
13. For instance, it may be methodologically inappropriate to try to disentangle some costs from others.

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List of Acronyms

BCR	Benefit-Cost ratio
BoD	Burden of disease
BRIIC	Brazil, Russia, India, Indonesia and China
CBAs	Cost-benefit analyses
CCSR	Centre for Climate Research Studies
CGCM	Canadian General Circulation Model
CEC	Commissions for the European Communities
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLC	Civil Liability Convention
COI	"Costs of inaction"
COPA-COGECA	Committee of Professional Agricultural Organisations in the European Union – General Confederation of Agricultural Co-operatives in the European Union
DALYs	Disability-Adjusted Life Years
DICE	Dynamic Integrated Model of the Climate and Economy
EA	East Asia
EEA	European Environmental Agency
EEZs	Exclusive Economic Zones
EIA	Environmental impact analysis
EMDAT	Emergency Database of Disasters
ENSO	El Nino/Southern Oscillation
FAO	Food and Agriculture Organisation
FEMA	US Federal Emergency Management Agency
GDP	Gross Domestic Product
GHGs	Greenhouse gases
GMT	Global Mean Temperatrue
ICES	International Council for the Exploration of the Sea
IFRC	International Federation of Red Cross and Red Crescent Societies
INSERM	Institut national de la santé et de la recherche médicale (French National Institute of Health and Medical Research)
IOPC	International Oil Pollution Compensation
IPCC	International panel on Climate Change
ITOPF	International Tanker Owners Pollution Federation Limited

LCA	Life-cycle analysis
LPO	League for Protection of Birds
MARS	Major Accident Reporting System
MDGs	Millennium Development Goals
MENA	Middle East/North Africa
NEV	Net economic value
NPL	National Priorities List
OCIMF	Oil Companies International Marine Forum
OPA-90	Oil Pollution Act of 1990
PCM	Parallel Climate Model
PRPs	“Potentially responsible parties”
PRTP	Pure rate of time preference
QALYs	Quality-Adjusted Life Years
REACH	Registration, Evaluation and Authorisation of Chemical Substances
ROW	Rest of world
SCC	“Social cost of carbon”
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales
SLR	Sea-Level Rise
TAC	Total allowable catch
THC	Thermohaline current
UK DEFRA	UK Department for Environment, Food and Rural Affairs
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
US EPA	US Environmental Protection Agency
USDA	US Department of Agriculture
US NIBS	US National Institute of Building Science
VOCs	Volatile organic compounds
VSL	Value of a Statistical Life
WHO	World Health Organisation
WRD	Water Resources Directorate
WSH	Water supply, sanitation and hygiene
WSS	Water Supply and Sanitation
WSSD	World Summit on Sustainable Development
WSTB	Water Science and Technology Board
WTA	Willingness to Accept
WTP	Willingness to Pay
WWAP	World Water Assessment Programme
WWF	World Wildlife Fund
YLL	Years of Life Lost

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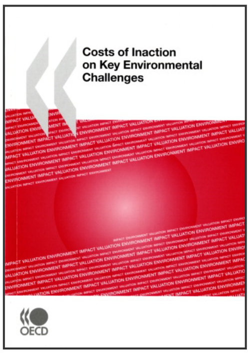

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