An Insurance-Led Response to Climate Change

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Abstract

Climate change is widely expected to increase weather related damage and the insurance claims that result from it. This will increase insurance premiums in a way that is independent of a customer’s contribution to the causes of climate change. Insurance provides a financial mechanism that mitigates some of the consequences of climate change, allowing damage from increasingly large or frequent events to be repaired. We observe that the insurance industry could offset any increases in premiums due to climate change through a levy on insurance premiums for fossil-fuel producers for example, without needing government intervention or a new tax. We argue that an insurance-led levy or government-led carbon tax must acknowledge a modern industry’s present carbon emissions and its fossil-fuel heritage (its “carbon inheritance”), that is, it should recognise that fossil-fuel driven industrial growth has provided the innovations and conditions needed for them to exist and develop. These industries have inherited the benefits of past emissions, and we argue that they should also inherit some of the cost of those past emissions, as manifested through any statistical increase in weather-related damage due to climate change. A carbon-intensity weighted tax or levy on energy production is one mechanism that would recognise a modern industry’s carbon inheritance, through increased energy costs of manufacturing and technology. It can be weighted to encourage the least polluting industries, and to discourage unnecessarily carbon-intense industries. The cost increases would initially be small, and will require an event attribution methodology to determine their size. A tax or levy can be phased in as the science of event attribution becomes sufficiently robust for each claim type, with the latter avoiding the need for government-led taxes, agreements, and intervention, through a global insurance-led response to climate change.

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The insurance industry is a multi-trillion dollar business with a 2012 world premium volume of $4 trillion US dollars [1], roughly 5-6% of world GDP (that was $71 trillion in 2012 [2]), with $24 trillion of global assets under management [1]. For the payment of an insurance premium, consumers and businesses are protected from the cost of rare and unpredictable events that they may not otherwise be able to afford. In this respect insurance provides a useful social function [3]. Climate change is widely expected to increase the frequency and size of insurance claims above that due to economic growth [4, 5]. Increased insurance premiums will be required to meet any increased claim costs due to climate change, making insurance less affordable, especially for the poorest and often most vulnerable people in developing countries [3, 6]. This is unfortunate, because insurance provides a re-distributive financial protection against erratic climate events, helping to offset some of the consequences of climate change.

The primary anthropogenic contribution to climate change is from cumulative CO₂ emissions [6], but insurance costs do not reflect a consumer’s individual contribution to them. For example, a developing country’s emissions per capita are a small fraction of those in developed countries such as those in Europe [7]. Arguably it would be fairer if the climate change related increases to insurance costs were paid for by the polluter, either directly or indirectly through a carbon tax for example [8, 9]. In 2015 six European Union oil and gas companies engaged with the United Nations to develop such a tax [10]. However, the insurance industry is in an almost unique position of being able to reclaim these costs directly itself through increased insurance costs on e.g. fossil-fuel producing industries. This would require a degree of co-operation with appropriate fiscal oversight and agreement between insurance companies to start such a scheme, but there is a clear incentive to do so, and a strong scientific and ethical case to support it.

The insurance industry is well organised, with international organisations such as the Global Federation of Insurance Associations (GFIA), the Association of British Insurers (ABI), and The Geneva Association. It has already demonstrated a willingness to take the lead in tackling climate risk, with 66 CEOs of the world’s leading insurance companies in 2014 endorsing the Principles for Sustainable Insurance (“PSI”), a set of guiding principles on the role insurance can play to tackle climate change related risk [1].

At present there are few cases [11–13] where there is a clearly demonstrable link between increased claim sizes and anthropogenic climate change. Therefore there is an opportunity
to gradually phase in the costs of attribution, by allocating increased costs to climate change for each claim type when the scientific case is clear. The acceptance of, and agreement about, what proportion of a claim might be attributed to climate change could involve some form of international certification or enhanced peer review, for example through the EUCLEIA EC project. Alternatively the decision could be made directly by insurance companies, in which case a degree of regulation might be required to ensure that the best and most up-to-date scientific knowledge is used. The agreed attribution costs could subsequently be used to define a carbon price. Event attribution presently takes much effort and intense peer-review. The results are likely to be clearest for temperature-related risks such as heat waves and flooding, but remain challenging for “singularity” type events whose appearance and impact are very difficult to predict, such as hurricanes and tornadoes for example. But the picture is changing as event attribution science progresses, and within ten years we expect to see widespread availability of near real-time event attribution systems [14].

Ultimately these mechanisms can transfer the climate-change induced insurance costs to the fossil fuel industry, and subsequently to the consumers of fossil fuels (and chemicals, plastics, etc), with higher total contributions from those who produce the most CO₂. However, to allow carbon emissions to be reduced in a humanitarian way in the long-term, alternatives to fossil fuels will need to be provided. A price disincentive alone is insufficient to prevent fossil-fuel use, although it is argued that increased prices have successfully led to the development of alternative energy sources in the past, by providing an incentive for innovations and their development [15]. The funds raised from the proposed levy would be substantial, and there is the option of using them to accelerate the transformation away from the use of fossil-fuels. If we chose to prioritise the outcome for both present and future populations, as opposed to solely the best outcome for today, then the optimum course of action might include some diversion of funds for mitigation or the development of low-emission alternatives.

In the decades ahead the effects of climate change are expected to become more pronounced, and even if emissions are reduced their cumulative total will remain a palpable threat. However, if fossil fuel emissions are successfully reduced then the scheme will demand contributions from a shrinking number of fossil fuel producers. Without the primary producers to pay the levy, who could, or should, cover the ongoing future climate change costs? Presuming that we will continue to need abundant energy in the future, and that
the levy reflects energy production in addition to carbon intensity, then revenues would be protected in a low- or post-carbon world by an increasingly large proportion being supplied by non-fossil fuel energy producers. An energy tax or levy would appear to be sufficient to retain income in the long-term, but why would it be justifiable for the resulting price increases to be shared by all consumers?

We propose that a levy needs to reflect not just present carbon emissions, but also to recognise that:

(I) No business or industry is wholly carbon neutral, and either indirectly or directly produces carbon emissions in their operation. For example, even subsistence farming today uses tools produced with carbon emissions. Energy use is one simple proxy for indirect carbon emissions.

(II) Independent of a business or industry’s present energy use and carbon emissions (either indirect or direct), a levy should recognise that modern civilisations have a fossil-fuel heritage and a “carbon inheritance” - that is, they are the result of over 250 years of fossil-fuel driven industrial growth that has provided the innovations and conditions needed for their existence and functioning - they have inherited the benefits of fossil-fuels, they should also inherit some of the resulting “carbon debt”.

Acknowledging our fossil-fuel heritage is not about allocating blame (financial or otherwise) to historic emissions, it is about recognising our carbon inheritance, and paying for the benefits that it brings. There are many positive outcomes associated with past emissions, with increased standards of living and improved health-care for example. These benefits are being felt increasingly widely throughout the developed and developing world, and by an increasingly large population. However it is necessary to recognise the long period of fossil-fuel driven research and development that is embodied in every modern technological product - today’s consumer benefits from past emissions. Those emissions allowed modern products and technologies to be innovated and developed, and this should (in principle) be reflected in a small price increase to pay for the climate change costs that we have also inherited. A financial recognition of modern products’ carbon inheritance at the point of purchase or use, seems necessary to provide the long-term revenues needed for a successful response to climate change.
The costs associated with our carbon inheritance could be determined in a number of ways, with various degrees of complexity. One approach would be to discern as fairly and accurately as possible the likely carbon emissions leading to the long-term development and production of a given product. This seems complex and intractable at present, but one could imagine scenarios where every product is digitally identified, and all contributions to it can be identified, traced back, and appropriately priced. Another approach might be to reflect the time from the industrial revolution’s start to the beginning of a particular industry, or to the registration of a business. An appealing option is to simply take energy-use as a proxy for technology use, through a tax or insurance-levy on energy production, and trust that it is a fair measure for most cases. This would go some way to reflecting our carbon inheritance and to discourage profligate energy use. It is also comparatively simple, and seems to be sufficient to ensure a long-term revenue stream to combat the effects of climate change.

Clearly the different options outlined above require further consideration; our primary aim here is to highlight the ingredients that we regard as necessary and (possibly) sufficient for a workable financial solution.

Using fossil-fuel is like using cheap credit - it is cheap and easily available, but has longer-term costs that will be paid sooner or later. Unfortunately the slow natural removal of excess atmospheric CO$_2$ is causing our “carbon debt” to increase faster than it is repaid [16]. Therefore a disincentive for carbon emissions also seems to be essential if we wish to minimise the rate of climate change, and the consequences that accrue from it. In the short term a tax or levy needs to be weighted so that it is higher for industries with the highest rate of emissions, to encourage the use and development of lower carbon technologies and to discourage “embedded carbon”. In the longer term the costs need to smoothly transfer to low-carbon industries as fossil-fuel industries are replaced. Simple, workable schemes to achieve both of these aims are not difficult to imagine, one example is in the Appendix. All of these schemes avoid penalising the development of low-carbon alternatives; only when they are the dominant producer will they absorb a significant proportion of total climate change costs. These costs are likely to remain a comparatively small fraction of total energy cost.

Many of the arguments put forward in this paper can by extension, be adapted to non-insurance events, that are estimated to contribute three times more loss [16]. This would take the scheme into the realm of national governments and their disaster relief agencies.
Another possibility is to acknowledge the contribution to global warming from methane emissions in the agricultural sector, again through either a carbon tax or insurance-led levy. In principle we support the intentions of both suggestions, but they add extra complexity and are a digression from the main topics that we wish to highlight here. We have also avoided a discussion of the more general impacts of climate change on biodiversity and wildlife, and have focused on human interests.

Some final remarks on the rationale for, and operation of, an insurance-led scheme. In principle insurance acts as an individual risk-transfer mechanism, but as noted earlier the benefits are in practice far broader. Maintaining affordable insurance is in the interest of insurance companies and their customers, as is a world economy that is successfully adapting to climate change. What we aim to highlight here are the benefits to both the insurance industry and its customers of offsetting any increases in claims due to climate change, through either a carbon tax or insurance-led levy on the greatest contributors to climate change and on the greatest beneficiaries from past carbon emissions. The implementation of an insurance-led scheme would probably require international co-operation among insurance companies, but as discussed earlier, the insurance industry is well organised and could arrange this without the inter-governmental agreements needed for a globally operating carbon tax and the effective redistribution of its proceeds. Because insurance companies often serve customers from different geographic areas, an insurance-led levy may need funds to be centrally collected and then redistributed. In that case it could be argued: Everyone has benefited from our carbon inheritance, albeit to different degrees, so why not simply use peoples’ consumption as a proxy for how much they have benefited? Then collect and redistribute the income centrally as either insurance subsidies, or for e.g. flood defences, or to help develop alternatives to fossil fuels? There are advantages to this approach. For example, a simpler attribution mechanism may be sufficient to determine the climate change cost, and some of the transaction costs associated with insurance markets could also be avoided, albeit replaced by administration costs for the scheme. It would also avoid any conflicts of interest that may arise between insurers who invest in fossil fuel industries for example. Clarke develops the case for a carbon tax to raise revenues that are administered and re-distributed by one or more of the insurance industry, the UN, or the World Bank. However, this scheme is likely to require a flow of payments from wealthier countries to those that suffer the worst consequences of climate change. This is fine in principle, but
will require politicians and electorates agreement, independent of their economic and political circumstances. An insurance-led approach has the advantage that it is in the industry’s interest to successfully mitigate the increased insurance costs due to climate change, and any flows of capital between companies (to offset insurance costs), can be arranged to avoid damaging any given company’s profits. As noted earlier, it is presently thought that about one third of all climate change related losses are insurance related. We would encourage any scheme that acts to offset the consequences of climate change in an equitable way, especially one that can continue to operate beyond the fossil-fuel era, possibly through a mechanism that recognises our carbon inheritance and debt as suggested here.

To summarise, whereas a government-led carbon tax could be used to offset any increases in insurance premiums that are (shown to be) caused by climate change, the insurance industry is in a unique position of being able to directly offset any increases in premiums through increased premiums on fossil-fuel and other energy producers, for example. The insurance industry is sufficiently large and well organised to be able to internationally implement either scheme. The advantage of an insurance-led levy is that it does not require negotiations with binding agreements that may be more detrimental to some countries than others (although negotiations will be required within the insurance industry). There is a clear economic, scientific, and ethical case for implementing a tax or levy of either type, and we have attempted to outline some key principles that we think need to be recognised and incorporated in the formulation of a successful long-term strategy. These include an acknowledgment that modern industries have inherited the benefits of our fossil-fuel heritage (our carbon inheritance), and should also share some of the cost associated with those past emissions. An energy tax or levy offers one simple long-term mechanism that is consistent with the principles we have outlined here, and can be arranged to ensure the most polluting industries pay the most, while allowing a smooth transition of costs to low carbon industries as fossil fuel industries are replaced. The insurance industry is uniquely positioned to lead an independent or complementary response to climate change, and we encourage organisations such as The Geneva Association to explore these possibilities.

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**Appendix A**

The tax or insurance levy could be set uniformly for all energy industries, or determined
by an industry’s rate of carbon emissions, with the largest polluters paying the most. For
example, if $c_i$ is the rate of carbon emissions by an industry $i$, and $a$ determines the carbon
inheritance paid for by all energy producers, then the fraction of climate change cost allo-
cated to an industry could be set as $(a+c_i)/\sum_i(a+c_i)$, so that the sum over all industries is
1. As fossil fuel industries decline, and the amount of carbon they emit is reduced, then the
denominator $(\sum_i(a+c_i))$ will become smaller, and the proportion of climate change cost paid
for by (low carbon) energy producers will smoothly increase, ensuring a steady long-term
revenue to mitigate climate change. The cost associated with carbon inheritance can be
determined in a number of ways, such as those discussed in the main text, or through simple
considerations such as the past rate of emissions in developed countries. An option is to
increase the proportion paid by fossil fuel producers and use this extra income to offset the
costs of low-carbon industries, possibly to the extent that they represent a positive income.
The intention would be to shift the balance in favour of low-carbon technologies, so as to
accelerate their development.

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