

Schroders TalkingPoint



Is climate change a threat to insurance-linked securities?

A question often asked by clients considering investing in insurance-linked securities (ILS) is whether climate change will have a negative impact on the asset class. The answer is not straightforward. Climate change will not necessarily have a negative impact on an ILS portfolio or on the ILS market as a whole, nor does it make these instruments more attractive. However, there may be some positive side effects.

Research into climate change

Information on the overall warming of the earth's atmosphere since the 1950s, as well as the human influence – via the use of fossil fuel – and the effects on oceans and the arctic ice caps, has been well publicised. Tremendous efforts have been put into research projects to better understand the effects climate change has on the frequency, severity and tracks of extreme weather events around the globe. In its special report in 2012¹, the Intergovernmental Panel on Climate Change (IPCC) – the leading international body for the assessment of climate change – provided an overview of the current findings on climate change effects on extreme events.

Apart from describing research outcomes, the report also sheds light on the uncertainty around the observations, based upon agreements and disagreements, across findings from various research centres. Apart from a general agreement on a probable increase in the number of heat waves, what stands out of the current research findings is the considerable level of uncertainty around the exact implications of global warming on weather events and on weather-related natural catastrophe in particular. For example, while some findings seem to agree on a possible increase in the number of hurricanes in the Atlantic basin, others indicate that climate change could also lead to a decrease in the number of hurricanes making landfall².

Climate change and ILS: limited impact

Although climate change has undeniably had an influence on the frequency and severity of certain natural catastrophes, its impact on insurance-linked instruments is more limited than one would expect at first glance. ILS performance is primarily driven by the occurrence, or absence, of natural catastrophes. It seems logical that the risk level of these instruments would be significantly changed by a global warming trend. However, the key here is the word 'trend'. Climate change is a gradual and long-term phenomenon, whereas ILS are typically short-term instruments. Most catastrophe bonds have a term of three years, and private transactions linked to natural catastrophe risk typically provide cover for 12 months. Over such periods, climate change should not have a discernible influence on the risk level of an insurance-linked security as modelled at the inception of the instrument. There is little need to take into account the long-term climate change effects on the frequency or severity of extreme events for instruments that expire before these effects may impact them.

The graph overleaf, from a 2013 World Bank report, shows that climate change is at the long-end of the spectrum of possible weather-related financial events. It will impact the ILS market and its composition long-term, but not individual ILS instruments or portfolios on an ongoing basis. The effects of climate change on the ILS market over multi-year or



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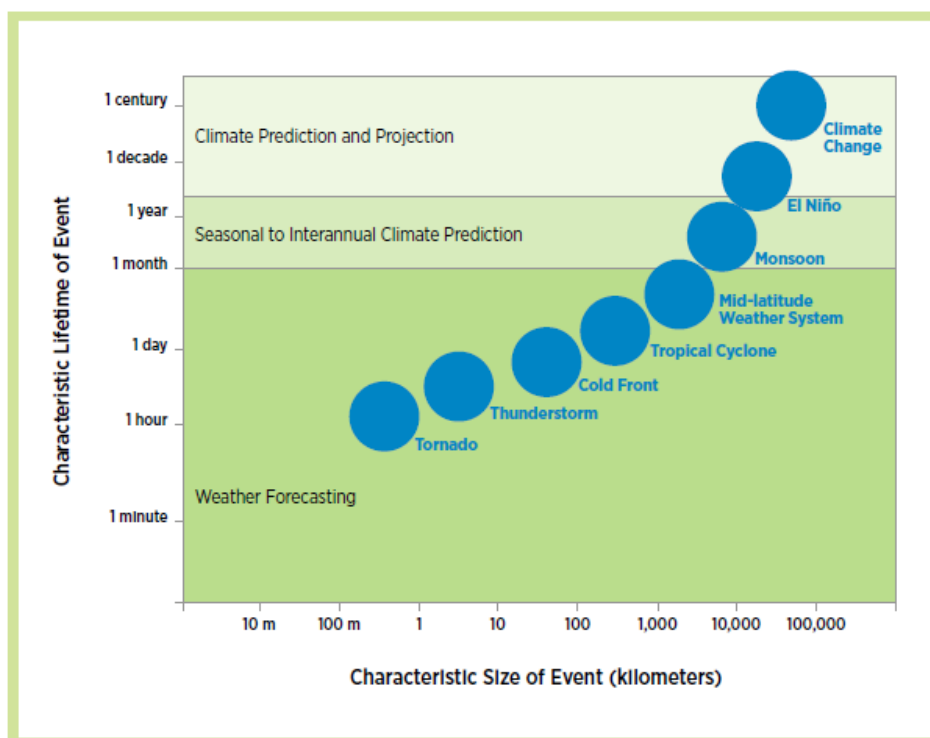
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¹IPCC, 2012: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation.

²Wang, Liu, Lee, and Atlas, 2011: Impact of the Atlantic warm pool on US landfalling hurricanes. Geophysical Research Letters.



multi-decade periods needs to be assessed in combination with its secondary effects; supply-demand dynamics, (re)pricing or upward moving trigger levels and shifts in insured exposures.



Source: The World Bank, November 2013: Building Resilience – Integrating Climate and Disaster Risk into Development.

It is important, too, to note that climate change only impacts a part of the ILS market. Only ILS covering natural catastrophe risk are (potentially) impacted, and within this category only weather-related insurance risks are affected. Other natural catastrophe risks such as earthquakes – a key driver of ‘tail risk’ for the overall ILS market – are not really affected. The same is true for tsunamis caused by earthquakes below the seabed or volcanic eruptions.

Catastrophe risk models ('cat models') are designed to help assess the economic impact of natural disasters on a given instrument or portfolio. This is achieved by calculating the probability of losses for all types of natural events such as cyclones or earthquakes, including those of magnitudes that have not been observed in the past. These models rely on a range of potential natural catastrophes listed in a so-called 'event catalogue' which are simulated based on historical observations.

To account for possible climate change effects on the frequency or severity of natural events, cat model users can apply an alternate view of the risk. This enables users, for example, to put more emphasis on risk as modelled using current or most recent climate conditions. This “near-term view” modelling for tropical cyclones, would thus emphasise warmer sea surface temperature patterns rather than considering the complete sea surface temperature records from the last 150 years. This would enable users to select a more up-to-date representation of the potentially increased risk from tropical cyclones over the near future.

In cases where the effects of climate change would lead to increased frequency or severity of weather-related events in covered areas, the affected instruments will not necessarily become more risky. If risk levels rise over time, ILS investors with modelling expertise would be able to model accordingly, and would command a higher risk premium to compensate for the increased risk of losses. Also, new research findings are embedded into modelling software constantly, which is also used by the issuers of insurance-linked instruments and, in the case of cat bonds, provided to prospective investors. Unless issuers are willing to accept rising costs for the use of these instruments, climate change will translate into higher attachment levels (the loss level where investors start to incur losses) over time or other risk-mitigation measures.

More extreme weather conditions, with catastrophes of greater severity, could lead to more damage to insured values that are protected by the ILS market; typically property. This is assuming, however, that the durability of these capital goods does not change. If buildings in areas that are prone to natural catastrophes are built or retrofitted to higher engineering standards over time – and therefore better able to withstand these events – then the total sum of insured losses could actually be lower for the same event.

Other factors to watch out for: demographics and weather cycles

Demographic forcing

In the past 20 to 30 years insured losses related to natural perils have certainly increased. Researchers agree that the main driver of this increase in losses is the shift of overall exposure and demographic growth. There are simply more people with insurance living in areas prone to natural catastrophes such as coastal areas or cities close to earthquake fault lines. Urbanisation and a higher concentration of values in these areas leads to higher potential losses from natural catastrophes. This is a key driver for the ILS market: a higher insurance density leading to higher exposure.

Global warming may lead to higher frequency and/or severity of certain extreme weather events in some regions. If these are densely populated areas – either already exposed or newly exposed – this could lead to an increased demand for (re)insurance over the medium-term which is beneficial for ILS markets. It should either lead to higher premiums paid or to a wider market with an increased opportunity set. Given the short-term nature of the natural catastrophe ILS market and the short spread duration, premium increases will not directly impact ILS portfolios. However, as these will take place gradually, investors will benefit from reinvestment at higher yield levels over time.

Other climate patterns

Although insurance-linked instruments covering natural catastrophe risks are too short-lived to be influenced by climate change, there are other shorter-term climatic factors that can influence the risk of these instruments over their lives. These are regularly recurring climate patterns that influence the occurrence of natural catastrophes. Some of these short-term trends have a 6 – 12 month time frame, or possibly even shorter. Hence, they will have an influence on insurance-linked instruments during their tenure.

Probably the most well-known climate fluctuation is El Niño, or more precisely the El Niño-Southern Oscillation (ENSO), which causes fluctuations in the surface sea temperatures in the Pacific and Atlantic oceans. El Niño phases tend to lead to higher hurricane activity in the northern Pacific basin and less hurricane activity in the Atlantic basin. Due to the direction of prevailing winds, Atlantic hurricanes more often make landfall than Pacific hurricanes and cause more damage to US coastal areas. Therefore an El Niño phase tends to be favourable for the overall ILS market. Over the life of, for example, a cat bond covering US wind risk, the ENSO cycle is likely to have a larger impact than slow-moving climate change.

Other medium-term, climate patterns include the North-Atlantic Oscillation (NAO), which influences the direction and magnitude of hurricane tracks across the Atlantic Ocean, and the Atlantic Multidecadal Oscillation (AMO) which affects rainfall and air temperatures in northern hemisphere regions as well as the number of hurricanes. We monitor these patterns very carefully: trends and trend changes are built into our portfolio construction process.

Summary

Forecasts for the precise effects of climate change are still surrounded by uncertainty. Nevertheless, global warming will have an effect on the frequency and severity of weather-related natural catastrophes. Individual insurance-linked instruments will only be marginally impacted by climate change. These securities have certain features which mitigate the impact that climate change could have on their risk level or overall attractiveness. Firstly, most cat bonds have a three-year maturity and most private deals covering natural catastrophe risks have a one-year maturity. Over these timeframes, climate change will not have an effect that cannot be foreseen and priced in at inception. Other regular weather patterns are more likely to influence the risk levels of ILS during their tenure. Secondly, the catastrophe risk models which are used to assess the risk of ILS can incorporate shorter-term trends and prevailing – or forecast – climate conditions.

Over the longer term, climate change is one of many elements that shape the overall ILS market. Other factors that play an important role are building standards, demographic changes, the pricing and attachment levels of insurance-linked instruments. These other medium- to long-term weather patterns can have a more pronounced effect on an insurance-linked instrument over its relatively short tenure than climate change itself.

In the long run, the impact of climate change may lead to a higher (re)insurance demand, both in regions which are already exposed and in new geographical areas. This could result in a broader and deeper ILS market due to new investible risks becoming available.

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