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Rising Temperatures, Seas and Claims: The Potential Impact of Climate Change

by **Lon A. Berk** and **William A. Schreiner, Jr.**

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The recent devastation of Hurricanes Katrina and Rita provides a stark reminder of the power storms have to destroy both lives and property. If the majority of climatologists are right, we can expect to see an increasing number of such storms as the world's climate changes. While the precise cause of climate change and the subsequent governmental response may be debated, few scientists doubt that climate change is a reality and that within this century, the Earth's climate will undergo substantial changes with huge consequences. Those changes will increase the globe's average temperatures, alter wind patterns, and raise sea and inland water levels in many places. The result will likely be more devastation of the sort witnessed in Katrina's and Rita's aftermath.

The existence of climate change presents a special challenge to sellers and purchasers of property insurance. Successful underwriting is based upon the art of predicting the future from past experience. Climate change undermines the basic principle underlying that art, namely, that the future will be materially like the past. Therefore, property underwriters need to account for climate change in determining not only the size of premiums to be charged and the nature of the coverage to be provided, but whether the risk is one that the company wishes to underwrite in the first place. Similarly, purchasers of insurance have to re-evaluate the sorts of coverages they desire for their properties, the limits that should be acquired and the premiums they are willing to pay.

The Reality

"Climate change is no longer a marginal issue," according to the Association of British Insurers. "We live with its effects every day. And we should prepare ourselves for its full impacts in the years ahead."

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Indeed, there is little doubt that our climate has recently undergone substantive changes. Over the last century, the average temperature has increased about one degree Fahrenheit, according to a 2004 study by the Pew Center on Global Climate Change. While one degree seems relatively minor to those of us who are not trained in climatology, the Pew Center found that this increase has created a long-term trend toward an earlier spring, an effect even nonscientists can appreciate. Based on a review of several underlying climate studies, the same study found the following recent changes in the United States' climate: 1) average yearly precipitation has increased overall, 2) this precipitation has occurred in fewer, more extreme events, and 3) winters have warmed more than summers.

A June 2004 report by the Association of British Insurers found that since the 1970s, the number of months per decade in which the United Kingdom experienced "extreme" warm and wet weather—where "extreme" means in the top 10% of historic conditions—occurred three times as often as otherwise expected. Moreover, the number of winter storms crossing the United Kingdom has doubled over the past 50 years, according to the ABI report.

On the other side of the world, New Zealand is experiencing similar effects. Insurers there have reported more erratic weather patterns brought on by global climate change, such as record rainfall events and resultant flooding.

As a result, some insurers have been studying these recent changes and, like the data for changes in the United States and the United Kingdom, the pattern they have discovered is unsettling. For instance, Munich Re's 2004 review of natural catastrophes found that the year was "dominated by extreme atmospheric events and weather-related natural catastrophes, both in terms of the number of events and the monetary losses they generated. The past year confirmed the fear that has long been expressed by Munich Re: global warming...is leading not only to an increase in the frequency and intensity of exceptional weather events but also to new kinds of weather risks and greater loss potentials."

The same report noted temperatures are increasing. Munich Re wrote, "2004 was the fourth warmest year since temperature recordings began (following 1998, 2002 and 2003). Apart from 1996, nine of the last 10 years are to be found in the list of the 10 warmest years since 1861." Munich Re also pointed out that the number of large natural catastrophes in each decade has steadily increased from 20 in the

1950s to 91 in the 1990s. Consequently, the report's authors conclude, "the insurance industry can no longer disregard...the impact of climate change on extreme weather events."

These are the changes already observed in the past. While there are no crystal ball estimates for the future, the likely changes could be even more dramatic. The Pew Center suggests the coming century could see additional warming of average temperatures between two to 10 degrees Fahrenheit in the United States, varying by region. The same study suggests that—like recent changes have indicated—we could see changes in the frequency and intensity of hurricanes and other storms. Additionally, areas of the Gulf Coast and southeastern Atlantic Coast will be under increased risk for flooding as seas rise and hurricane frequency increases.

The Association of British Insurers also predicts more changes in the United Kingdom's weather patterns over the next century. The ABI expects Britain will see average temperatures increasing by two to four degrees Celsius, wetter and stormier winters, more intense rain storms, average wind speeds increasing by 6% in some parts of the country, and sea levels rising up to two and a half feet.

Taking a worldwide view, Munich Re foresees a similar picture, which includes:

- An increase in the "frequency and severity of natural catastrophes," from around 650 natural catastrophe events in 2004 to 800 or more by 2015 (90% of which will be weather-related)
- An increase in the intensity and number of tropical cyclones (hurricanes and typhoons). On average, in the second half of the century, storms will be half a category stronger on the Saffir-Simpson scale
- Windstorm activity in areas such as Japan and the Pacific Northwest will increase distinctly
- Warmer summers for many parts of the world; the record heat Europe experienced in the summer of 2003 may be the "summer of the future"

The Economic Impact

The Pew Center predicts that the GDP of the United States will be as much as 3.0% lower in 2100 as a result of climate change. This threatened reduction results primarily from the impact of climate change on agriculture and the mortality and morbidity of the American workforce, but the energy and food sectors of the economy will be severely affected as well.

More specific to the insurance industry, the Association of British Insurers projects that flood and storm damage claims in the United Kingdom, which doubled between 1998 and 2003, could triple again by 2050. The ABI also expects the pure risk rate of weather catastrophes to continue increasing at 2% to 4% per year and cites a United Kingdom government report that estimates the cost of annual damage from climate change-related flooding in that country could increase from £1 billion to £21 billion by the end of the 21st century.

Munich Re notes that insured catastrophe losses in 2004 were the highest ever at \$44 billion—that is until that record was topped again by the 2005 hurricane season. A continuing trend of steadily increasing natural catastrophe losses has been in place since 1970, and Munich Re does not expect to see it abate any time soon.

The Department of Energy Report echoes those findings: “[t]here is a clear upward trend in global weather-related losses, even when adjusting for inflation. An ‘average’ year these days produces 5.5 times as many weather-related natural disasters, globally, than 40 years ago, resulting in 13.6 times the insurance losses.” Those losses have an impact on premiums and reserves: between 1985 and 1999, the report finds, the ratio of global property insurance premium income to losses fell three-fold. While the American Insurance Association took the opposite view in 1999, asserting that the likely impact of climate change to the U.S. P/C market was exaggerated, the Department of Energy has stated that Hurricane Andrew nearly drove State Farm Fire & Casualty and Allstate into insolvency.

Climate Change and Insurance Claims

Most contracts for property insurance contain exclusions—such as the exclusions relating to damage caused by flood, mold and inherent defects—that may reduce the coverage available for claims resulting from climate change. But the increased frequency and severity of these claims means that risk managers will have to look for insurance written without these exclusions or take steps to self-insure their increased exposure to climate-related risks. But it is just as important to know what the likeliest claims may be.

Heat. Temperature increases alone can cause structural damage, such as shrinking thermal breaks in windows, as well as affect mold growth. High temperatures are also correlated to lightning strikes and lightning-related losses.

Rain. Increased rainfall means more claims relating to straightforward claims for water damage to

buildings as well as for the inevitable mold problems that follow. Heavy rainfall will also lead to more sewer backup claims, more flooded basements from other causes and more buildings damaged in mudslides. Such claims themselves, while generally excluded from most property contracts, in some jurisdictions might give rise to covered claims. Rain pooling in the ground below those basements can lead to an increase in the number of claims for settling-related and collapse-related building damage.

Wind. Wind damage claims to property are already increasing in number and severity. Increasing average wind speeds, as predicted by the ABI Report, and the increasing number of wind-intense hurricanes, typhoons and other severe storms forecast by the Munich Re will lead to increased wind claims.

Flooding. While most property insurance contracts in the United States do not cover floods, the same may not be true in other countries. The Association of British Insurers foresees a possible twenty-fold increase in the number of, and overall loss attributable to, river and coastal flooding claims in the United Kingdom. And even where flooding is excluded from coverage, secondary problems caused by it, such as fire, explosion or sprinkler leakage, may not be.

Climate change will likely lead to increased demand from purchasers of insurance that such exclusions be eliminated or further limited from property insurance policies. With increased flood claims, one may see increased federal and state regulatory pressure on private insurers to write flood insurance.

Wear, tear and deterioration. High temperatures, heavy winds and heavy rains can combine to damage roofs, windows, walls and foundations. Such damage, even if it is not immediately noticed by the policyholder, can weaken the structure considerably. Structural damage in buildings weakened over time implicates the wear/ tear/deterioration exclusion. For example, in *80 Broad Street v. United States Fire Ins. Co.*, the lessee of a 40-year-old building brought an action against its property insurer, seeking coverage for buckling of marble on the face of the building. Undisputed testimony indicated the marble was buckling from "rain, frost, seepage, rust and corrosion combined with the original improper construction." The court found that the buckling would be excluded from coverage.

Business income and extra expense. Many commercial first-party insurance contracts provide some form of coverage for lost business income. Any

type of natural catastrophe could implicate this coverage: a hurricane, a brush fire, a severe windstorm or other types of climate-related disaster could lead to claims under this provision, at least theoretically.

Off-premises property damage. Some first-party contracts provide coverage for loss or damage to covered property caused by the interruption of service to the described premises. Generally, the interruption must result from direct physical loss or damage by a covered cause of loss to premises away from the covered property. Those services provided away from the premises can include water pumping stations, water mains, communication lines, power plants, substations and power lines, among other facilities. Climate change may lead to increased claims under this coverage section as well.

Collapse. Property contracts often provide that windstorms and hail are covered causes of loss. First-party contracts also frequently provide coverage for collapse of a building, when caused by one of the enumerated causes of loss in the contract, which often include lightning; windstorm or hail; weight of snow, ice or sleet; or the weight of rain that collects on a roof. Climate change may increase the frequency of collapse claims.

Changing Cycles

Insurers and risk managers are accustomed to cycles of change and transitions from soft markets to hard markets, from bad years of natural disasters to good years. But climate change is making these cycles shorter and sharper. Facing an upward trend in significant catastrophe and weather-related claims and losses, property insurers will increasingly find themselves in a new and ever-changing environment in which they must accurately assess and write risk.

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