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Major Hurricane Ian: How Good Is Your Climate Risk Model? - Moody's

As the need to understand climate risk grows ever more urgent, asset managers, lenders, corporates, and businesses all need to be confident that their climate risk models can capture the complexity of climate and weather events – in order to satisfy their regulators, boards, and shareholders.

Moody's Climate on Demand has led the way in the provision of climate risk analytics, and during 2023 this innovative solution will deliver new risk metrics that capture the financial impacts of climate risk by integrating the expertise of Moody's RMS market-leading climate risk modeling capabilities.

But how can users distinguish what makes a good climate risk model versus an inadequate one? Let's take the case study of Hurricane Ian in 2022 to examine how well a climate risk model can reflect the reality and complexity of climate and weather events both now and in the future.

Major Hurricane Ian was an extremely large and devastating "all perils" Category 4 hurricane that struck Florida in September 2022 and will be ranked as one of the costliest hurricanes to ever affect the U.S.

Its size and intensity brought significant damage to Florida's manufacturing, agriculture, tourism, and distribution sectors. Transportation continues to be affected months after as infrastructure is repaired, and the cost of property repairs will be one of the highest ever – and not all will be covered by insurance.

To accurately model the impact of extreme weather events such as Hurricane Ian and how they will change in the future requires a tried-and-tested, sophisticated and multi-dimensional approach.

Only Moody's RMS delivers forward-looking climate risk models which combine best-in-class catastrophe models from the (re)insurance industry together with climate model outputs and the latest peer-reviewed scientific consensus. This helps capture the full range of possible events and their impacts that can occur now and in the future.

Impact of Hurricane Ian

Ian was the latest in a series of hurricanes that rapidly intensify immediately before landfall, bringing extensive rain and flooding across Florida on top of severe wind and storm surge damage in the landfall area; all trends which are expected to continue due to climate change.

Storms such as Ian in 2022, Ida in 2021, Harvey and Irma in 2017, Sandy in 2012, Ike in 2008, and Katrina in 2005 show the importance of utilizing climate risk models which account for all drivers of impact across multiple hazards.

The models can then establish the impact of these hazards on different asset types, and incorporate

the current background of economic stress and inflation, the amplifying effects of extensive infrastructure damage on business interruption and downtime, together with the compounding effect on the overall loss from the many assets and businesses all being affected at the same time across the state.

Moody's RMS models account for all these factors due to our physical climate risk modeling framework which has led the way in assessing the financial impacts of physical climate risk for the past 30 years in the (re)insurance industry.

These models are now being embraced by other sectors, which recognize that understanding the impact of events such as Ian requires the use of sophisticated risk models which capture the complexity of weather events and how climate change will affect them in the future.

By climate conditioning our catastrophe models and re-simulating the hazard to account for future climate impacts, for example, sea level rise, ocean waves, and coastal flooding, our climate risk models bring the best of both worlds to the industry.

While Ian made landfall in a similar area as Hurricane Charley in 2004, the storm was more than double Charley's size with four times the destructive potential[1], making Ian's impacts significantly more material and demonstrating the impossibility of predicting future damage from past storms.

Moody's RMS models account for the full range of possible hurricanes that can strike the U.S. in terms of location and strength, and how climate change may affect these factors in the future. In addition, our impact scores and financial loss metrics account for all aspects of hazard, such as the impacts of tornadoes, rainfall ingress through damaged roofs, and wind-blown debris as well as the major driving factors of wind, storm surge, and flooding.

As well as catastrophic damage to properties, Ian caused destruction to large amounts of infrastructure such as roads, bridges, and power networks. More than 2.6 million people were without power across Florida following the storm's landfall.

The considerable infrastructure damage, particularly in the hardest-impacted areas like Fort Myers and Cape Coral, will slow down the recovery and increase repair costs and losses, especially for islands disconnected from the mainland due to bridges and piers being washed out, such as Sanibel Island. The full recovery could take a few years in these areas, and some businesses and residents may never return, as witnessed after Hurricane Katrina hit New Orleans in 2005.

On top of such a destructive hurricane, the impact of recent inflationary trends will further increase losses. Shortages of materials, qualified contractors, and insurance claims adjusters in Florida add to the near-record inflationary trends being experienced in both the domestic and global economy.

The level and extent of disruption to water, sewage, and electricity supplies, extensive infrastructure damage, and delayed repairs due to residents unable to return to the area, all start to drive long-term consequences.

A loss of income for businesses and increased costs for residents who have to move elsewhere for weeks and months, means they are unable to start the process of repair and recovery. RMS modeling accounts for the various ways in which these costs and losses escalate within a major catastrophe through economic demand surge and super-catastrophe compounding effects.

The repair and recovery from Ian will take many months, and for some, years. However, what is clear is that without a deep understanding of all the drivers of impact and loss, you may be underestimating the risk of such events in the future.

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by Claire Souch

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