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Parametric Re is thought to be the special purpose vehicle. If successful, the deal would represent the first insurance securitisation in Asia. Dan Rosenbaum of RMS commented: "Geographical diversification will be very important for the rapid development of the market."

Special feature: El Niño bonds

■ In response to the billions of dollars of losses caused so far by the weather phenomenon El Niño this year, economists at Columbia University working with its Earth Institute have developed, and are promoting and seeking a patent for, an innovative product which aims to help corporates, insurers and potentially whole countries transfer the insurance risk of the El Niño to the capital markets. A team led by Professor Graciela Chichilnisky, Unesco professor of economics and mathematics, has proposed the issuing of two linked bonds – one for the El Niño period with higher returns, and one for periods in between El Niño. It is hoped that the product will hit the market in the spring and that countries that might stand to benefit include Zimbabwe; estimates are that 10% of crops in are severely affected by the El Niño. Others such as Peru have also been hard-hit. At the moment the programme's developers are in the process of forming a commercial partnership between the university and a keen investment bank.

The scientific underpinning of the programme is the assertion that patterns of weather attributable to the El Niño phenomenon call into question existing actuarial tables. These tables may be limited in the face of regimes of weather that switch. By establishing which regime is in existence, the insurer is better able to calculate the risks. The key innovation claimed by the scientists working on El Niño bonds is that, where the frequency of certain cats like earthquakes are hard to gauge, the occurrence of weather patterns caused by the El Niño phenomenon – and so losses, can be calculated through scientific modelling. The key point is that the El Niño is periodic; it keeps coming back and a pattern can be observed. Columbia University has gone a stage further and attempted to innovate a financial product which benefits from scientific knowledge which, according to Professor Chichilnisky, "just wasn't around in the last El Niño period of the 1980s".

"The El Niño introduces very serious uncertainty about actuarial tables," said Professor Chichilnisky. "When it is an El Niño period, the risk of hurricane and flooding is substantially different than an in-between period. It is a periodic event, and it is possible to tell what damage will be caused; climate scientists can tell six to 12 months in advance on El Niño and the probability of the regime."

The programme asserts that the El Niño can be used as a kind of benchmark to which cats, and the losses they incur, can be gauged, leaving room for the possibility for an index. "For example, if the El Niño is on, the frequency of hurricanes in southern USA is lower. The El Niño plays a pivotal role. When the El Niño is off, you have a different actuarial table. Most natural hazards come into one regime; El Niño is a case of regime switch. If you have an insurance business and the actuarial table switches on you, either you overcharge and lose clients, or you don't and leave yourself over-exposed. The main challenge was to develop two actuarial tables that keep switching; one for El Niño, one for in between [the period of time between cycles]. We utilised climate scientists and developed a financial instrument that can deal precisely with the regimes switching," said Professor Chichilnisky. The bonds proposed differ from those issued in the typical cat deals. "What we had to do was marry a security with an insurance contract," she said.

The product is based upon the catastrophe bundling model developed by the university. That used the idea of negative correlations; hedging insurance risk is perfectly possible because others (ie, the construction industry) stand to win from catastrophes. El Niño bonds continue the idea that effective risk financing requires a combination of an insurance contract and a security; both on their own are not enough, but should work in tandem. The bonds depart from the typical cat bond offerings.

Cover for the client is made flexible, with optimal premium pay-out. "The proceeds of the sale of the bonds becomes a fund for how you cover the cat events," said Professor Chichilnisky, leaving open the possibility for making use of funds in non-cat times in preparation for when cats do occur, a strong feature of the original catastrophe bundle products.

Insurers can diversify their portfolios and the risks involved through the two separate bonds. "The law of large numbers requires that risks be independent, behaving for example as car accidents or fire hazards. These conditions produce reliable actuarial tables, which form the scientific foundation for pricing in the insurance industry. However, when large-scale catastrophic property losses occur, risks are no longer independent because a hurricane affecting one insurer will also affect every other insurer writing coverage in the same geographical area. In effect, cat property losses are highly correlated risks as opposed to independent risks. Since large-scale property cats impact a significant part of the insurer population both in physical and financial terms, the law of large numbers does not operate, making it impossible for reinsurers to diversify these risks."