

Quantitative Analysis of the Basis Risk of Index-linked CAT Risk Securities

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Insurance-linked securities (ILS) have been widely used as an alternative risk transfer of catastrophic (CAT) insurance risks to the capital market. The market of ILS is experiencing a rapid growth as the first quarter of 2015 has become the biggest first quarter ever in the history of ILS issuance.

While using an ILS with an index trigger rather than an indemnity trigger to transfer/hedge risk, a well-known problem is the existence of basis risk, which could be substantial when the dependence between the index and the sponsor's loss (that is to be hedged) is not sufficiently high.

In this paper we first develop a model to capture the basis risk, and then devote ourselves to its quantitative analysis. Using extreme value analysis and Monte Carlo simulation, we demonstrate the sensitivity of the basis risk to the dependence between the index and the sponsor's loss.

Keywords: Basis risk; Catastrophic risk; Copula; Dependence; Hedging; Index trigger; Insurance-linked securities; Regular variation