

## Title: An Extreme-Value Theory Calibration Scheme in Reinsurance and Insurance-Linked Securities

We establish a 'top-down' calibration scheme to approximate loss distributions of reinsurance products and Insurance-Linked Securities (ILS) based on 3 input parameters: the *Attachment Probability*, *Expected Loss* and *Exhaustion Probability*. Our method is rigorously derived by utilizing a classical result from Extreme-Value Theory, the Pickands-Balkema-de Haan Theorem. The robustness of the scheme is demonstrated by proving sharp error-bounds for the calibrated curves with respect to the *supremum* and *L<sup>2</sup>-norms*. The practical implications of our findings are examined by applying it to Insurance Loss Warranties (ILWs): the method performs very accurately on a stand-alone basis for each transaction, as well as on a portfolio level when aggregating risk via the Fast Fourier Transform (FFT). Our approach can be used in a variety of applications such as vendor model blending, portfolio optimization and premium calculation.

Keywords: Extreme-Value Theory, Loss Exceedance Probability Curve, Reinsurance, Insurance-Linked Securities.

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