

An Extreme Value Approach To Pricing Credit Risk

Credit risk is one of the most critical exposures when engaging in business with counterparties in the financial industry. Imagine finding a simple and straight forward way to price credit risk with statistical extreme value models - how useful would that be!

The fundamentals behind the thesis *An Extreme Value Approach To Pricing Credit Risk* is to find a simple and straight forward way to use public data to price credit risk. This with help of statistical extreme value models and historical Credit Default Swap (CDS) prices as underlying data.

The aspect of dealing with credit risk is of such importance in the financial industry and needs to be incorporated into the price of financial derivatives. This adjustment is commonly known as CVA, Credit Value Adjustments. Today, the process of pricing CVA is complicated and incorporates a higher level of mathematical simulations. The suggestion behind the thesis is to find a more simple and intuitive way to estimate credit risk.

Three different models are outlined in *An Extreme Value Approach To Pricing Credit Risk* to price credit risk. The models outlined are the Block Maxima, Peak-over-Threshold (POT) and Probable Maximum Loss (PML). The reasoning is to examine CDS prices considered extreme and fit the data to an extreme value distribution.

The first model, the Block Maxima, group the underlying CDS prices in blocks. Every maximum point in each block is considered an extreme event and then fitted to an extreme value distribution.

The second model, POT, includes a threshold value where all CDS prices exceeding that threshold are considered extreme events. The exceedances are then fitted to an extreme value distribution.

The third model, PML, considers worst given loss with regards to chosen risk levels with respect to a range of different time horizons.

An Extreme Value Approach To Pricing Credit Risk put forward approaches with suggestive results. However, the dependency in the underlying data are noticeable hence makes the mathematical models ambiguous. Longer series of observations are needed to make inference on the future price of credit risk. Favourably, one would need more frequent data points and not necessarily observations further back in time since historical CDS prices too far back in time might not be of relevance of pricing future credit risk.

To conclude, all three models mentioned above result in a price of credit risk for a given year expressed as a CDS price in Euro. However, the accuracy of the credit pricing may be debateable due to the ambiguity of the independence in the underlying data.