Counterparty Credit Risk Analytics

Counterparty Credit Risk (CCR) is the risk of a counterparty not fully meeting their financial obligations. In attempting to manage this risk the probability, magnitude, and possible offsetting effects must be estimated.

Traditionally, credit exposure arose from lending activities, and was measured as simply the book value of all outstanding obligations from a counterparty. Although book value is a fairly poor measure of credit exposure — the market value of an obligation often diverges significantly from its book value — it does have the advantage of being a fairly simple and consistent measure that can provide a reasonable sense of the credit exposure to a counterparty.

Unfortunately the notion of book value starts to break down when examining pre-settlement risk on many derivative instruments. Par swaps and bonds have a market value of zero when they are first booked. Many other derivatives have a credit exposure far higher than their book value.

A more accurate, probabilistic measure for potential credit exposure is required. The moment a transaction is committed, its market value or exposure changes as time progresses and market rates change. If this market value is in profit then there exists a credit risk exposure, as the unrealised profit will be lost upon the party defaulting. The problem is that only the current value is known, and what exposure the trade will obtain during its future life.

One can solve this problem by taking the current market rates and predicting what they may be tomorrow, and measuring the exposure of the trade under these new conditions.

These predictions are produced statistically to simulate the way market rates move in the market place. Historical data is examined to determine the behaviour of each rate and how that rate interacts with all the other rates. This information is used as parameters in the statistical simulation of future market rates called market scenarios.

This process is repeated for the next day and so on until the trade expires. The results are market values of the trade, for all the days in the duration of the trade, which is called an exposure profile.

The problem with this approach is that a single statistical prediction of future market rate is unlikely to be correct so this whole process is repeated many times, with the statistically generated future markets being different each time.

This produces a distribution of possible values for each future date. Applying a confidence level to this distribution will select a single value for each future date and therefore produce an exposure profile. To save time only a sample, defined by the user, of future exposures are calculated.

Exposure profiles for each trade are calculated, and then combined together in portfolios, taking into account netting agreements, collateralisation agreements and guarantees. Path-dependant trades are transitioned appropriately as price barrier levels are encountered, or payments are rolled off.

In this way, on is able to accurately determine the sensitivities of the portfolio to different rate and price movements, and determine the spectrum of possible losses given specific rate movement scenarios.

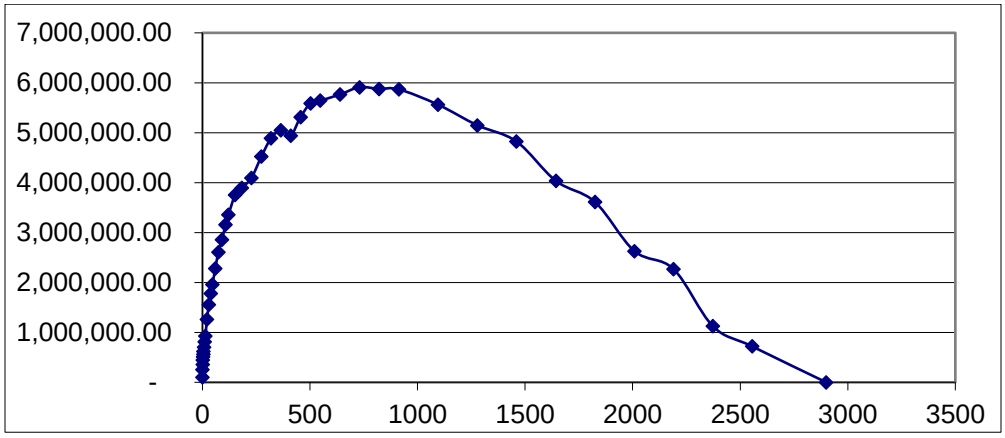
CCR allows the risk manager to quantify and analyse credit exposures based on the rules set by the business. Each trade is mapped into various portfolios depending on the characteristics of the trade, the counterparty hierarchy, or the internal business unit managing the deal.

CCR allows the risk manager to set and manage credit limits and also to track the utilization of the credit limits. Different types of limits thresholds may be set and alerts generated if threshold levels are breached.

Settlement risk is the risk that when an exchange of assets is supposed to happen upon settlement of a trade, one of the counterparties fails to meet their obligations.

Settlement risk usually creates very large credit exposures which last for brief periods of time. One can calculate the risk exposures arising from settlement risk and spread the risk across days depending on the characteristics of the trade.

Credit exposure (CE) is the cost of replacing or hedging a contract at the time of default.



You can find more details at

https://finpricing.com/lib/EqBarrier.html