Credit Spread

Credit spread is the credit funding cost for a firm. For many products, credit spread is the major risk driver. Credit spread impacts discounting, default probability, and early termination.

There is only one base interest rate per currency, corresponding to the bank's unsecured lending/borrowing rate (such as LIBOR). The interest rate used to discount cashflows may include a credit spread above or below the base rate.

The risk-free discount factor is $\exp(-rT)$ where r is the interest rate and T is the maturity. The risky discount factor is $\exp[-(r+s)T]$ where s is the credit spread.

Credit spread can be derived by either structural model or reduced-form (intensity) model. The structural approach regards default as an endogenous event by focusing on the capital structure of the firm. Whereas the reduced-form approach does not explain the event of default endogenously, but characterizes it exogenously by a jump process.

Structural models are derived from theory and often contain some unobservable assumptions, while reduced-form models use only market observable information. Therefore, many practitioners in the credit trading arena have tended to gravitate toward the reduced-from models given their mathematical tractability and market compatibility.

Many researchers group similar credits. These groupings are loosely referred to as rating categories. Regardless of how the rating categories are constructed and of how many categories

there are, it is necessary to specify the default likelihood for each category and provide a credit spread to correspond to each category.

Credit contingent contracts can be written in the form of default probabilities, since there is a one-to-one correspondence between between the input credit spreads (prices) and the unconditional default probabilities of individual names.

A CDS index on a portfolio can be viewed as the credit spread to a basket credit default swap on that portfolio. As a result, an index position at a level $\bar{s}$ is equivalent to a portfolio of CDS on the reference names, where all CDSs are entered at the same spread

Credit spreads can be simulated using mean reverting processes with time dependent parameters. For the purpose of spread evolution, names are grouped into classes of similar credit ratings. This classification simplifies the number of inputs required. Time dependent process parameters allows the inclusion of a spread term structure if desired.

References:

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