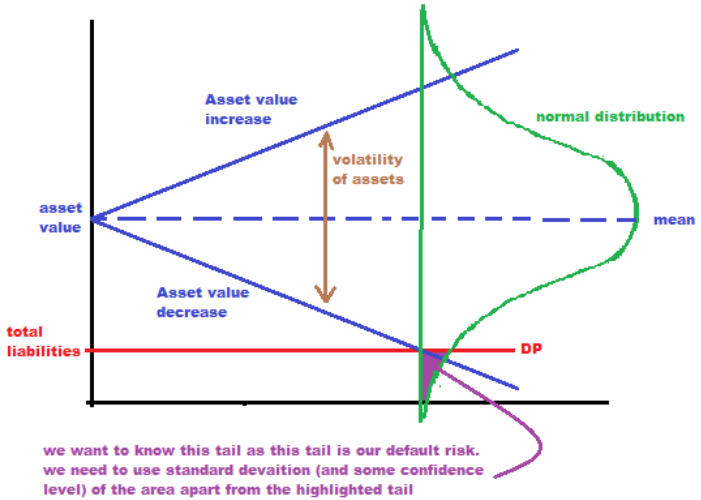
Default is the potential that an obligor (commonly a borrower) will fail to meet its obligations in accordance with agreed terms. A company will default if the value of its assets fall below the book value of liabilities. Thus default is a function of:

- The value of the assets
- The volatility of the assets
- The extent of leverage: Leverage is the relationship between debt and equity.

Calculating Distance to Default (D-D):

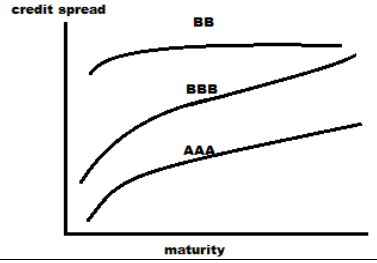
- **D-D** is the number of standard deviations that asset values are currently "away" from default'
- Calculated as: **D-D = (Ma - DP) / (Ma x Avol)**
  Where:
  Avol = Asset Volatility 1 standard deviation in observed changes in asset values (Ma).
  Ma = Market Value of Assets = MVE – MVL

The EDF is based on the history of default for firms with same std. deviation away from default over the timeframe.



	Description	Formula/calculation	Limitation

Credit Spreads	The margin compared with the risk free rate, that is designed to compensate (like the premium) the lender or investor for the risk of default.
	• Can only Increase above or fall down to the risk free rate (not below it).
	• The Term Structure of Credit Spreads is not parallel uniform function
	  ○ Risk of default increases with time
	  ○ The longer the time horizon or time to maturity, the larger the volatility and the wider the credit spread.
	• Credit spread and hence the market sets the probability of default
		C= k – i
		Where
		k = Yield on credit risky security i=Yield corresponding risk free security
		
		Function of : **(1+i)=p(1+k)**
		The expected probability of default = pd = (1-p)
		where p = Probability of Repayment
		(1+i)=(1-p)(1+k)
		
		Note: The cumulative Pd will be the product of marginal Pd's in each period {Cpd= 1 –(p1 x p2 x p3)}
		
		In the event that the obligor defaults; the bank will receive payment (A) by way of recovery:
		A = λ(1+K)
		where λ =expected recovery rate
		Therefore:
		(1+i)= {(1-p) x λ(1+K)} + {p(1+k)}
			○ The absence of market rates for the risky securities
			○ The absence of market rates for risk free securities
			○ Sparse data points
			○ Inefficient or illiquid markets
			○ Frictions in trading markets
			○ Liquidity spreads

		To calculate the Pd for each period we need to calculate the forward rates (f) for i and k. The formula below (for i in this case) can be used: **1 + f n/m = {(1 + im)m }/ {(1 +in)n}** solve for f n/m