**CDS Pricing and Bootstrapping**

**Upfront Payments**

Standard coupon on CDS contracts is either 1% or 5%. If the fair CDS spread differs from these coupons then there is an upfront payment associated. Same is the case when trading CDS after inception date. Market quotes of CDS are available in spreads. If the market quote differs from the coupon, then there is an upfront payment associated. If the coupon is 100 bps and the par CDS spread is 132 bps then upfront payment is 32 bps \* RPV01. RPVO1 is risky present value of 1 basis point. Therefore, the difference in coupon and fair spread is discounted to present and weighted by survival probability to compute the upfront payment that the buyer of CDS contract needs to pay.

**Bootstrapping**

* Quoted CDS spreads across maturities/credit curve is sourced
* Starting with shortest maturity, survival probabilities are computed. Market quoted CDS spread is used and premium leg is set equal to default leg to back calculate the implied survival probability.
* Then survival probability for the subsequent maturity is computed considering the survival probability in the previous period just calculated. Thie way we compute the probability of survival curve. This looks like an exponential decay curve much like discount factor curve. The intensity of this curve or lambda is the hazard rate.
* Survival probabilities are differentiated to compute the default probabilities in a period.

These survival and default probabilities are used alongside cashflows and discount factors to value CDS values.

Following formula is used to bootstrap survival probabilities using credit curve.

