Credit Risk

Counterparty credit risk refers to the risk that a counterparty to a bilateral financial derivative contract may fail to fulfill its contractual obligation causing financial loss to the non-defaulting party. It will be incurred in the event of default by a counterparty.

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Only over-the-counter derivatives and financial security transactions (e.g., repo) are subject to counterparty risk. If one party of a contract defaults, the non-defaulting party will find a similar contract with another counterparty in the market to replace the default one. That is why counterparty credit risk sometimes is referred as replacement risk. The replacement risk is the MTM value of a counterparty portfolio at the time of the counterparty default.

Counterparty credit risk measurement is credit exposure (CE). It is the cost of replacing or hedging a contract at the time of default. Other measures include Potential future exposure (PFE), Expected exposure (EE), Expected Positive Exposure (EPE), Effective expected exposure (EEE), Effective EPE, Exposure at default or EAD.

The risk that a counterparty defaults prior to expiration of a contract. Credit exposure is uncertain (stochastic) so that Monte Carlo simulation is needed. Potential future exposure (PFE) is credit exposure at specified quantile on a future date. Expected exposure (EE) is average (expected) credit exposure on a future target date.

EPE (Expected Positive Exposure) is Weighted average of EE. Effective expected exposure (EEE) is max EE before time t. Effective EPE is weighted average of Effective EE.

Exposure at default or EAD = α * EffectiveEPE; where α = 1.4. Effective maturity M is some deals' maturity over one year

Reference:

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