Credit Valuation Adjustment (CVA)

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Credit Valuation Adjustment (CVA)

- CVA is probably the most widely known and best understood of the XVA. CVA captures the 'discount' to the standard derivative value that a buyer would offer given the risk of counterparty default. In concept, it is somewhat akin to credit provisions on loan assets.
- derivatives are marked to market, requiring a 'market price' to accept the risk of counterparty default. This is often calculated by reference to the cost of hedging the counterparty credit risk on the contract, through credit default swaps (CDS)
- A loan contract typically has standard and predictable future cash flows, and therefore an easily calculated 'credit exposure'. Derivative cash flows are highly variable and difficult to predict. As such, sophisticated CVA calculations involve Monte Carlo approaches to determine the range possible future exposure
- Currently, the industry is revisiting the blanket use of CDS rates in CVA calculations. This is due to reduced liquidity in CDS contracts, flowing from lower participation by banking intermediaries reacting to banking regulation such as the Volcker rule

Introduction

- **What is market CVA?**
  - Market CVA is the credit reserve adjustment made to derivatives transactions to account for counterparty risk
  - Market CVA is bilateral at the financial reporting level. Bilateral CVA consists of
    - Asset CVA – this represents the expected cost of Citi's counterparty exposures (loans)
    - Liability CVA – this is the expected credit costs incurred by the counterparty (deposits)
  - Bilateral market CVA can be thought of as the net market value of an American option by **both sides** to default on the derivative

- **How is it calculated?**
  - The methodology to calculate both Asset CVA and Liability CVA is similar. In the formula below, we do not differentiate between asset/liability CVA.
  - CVA is the expected value of credit losses over the lifetime of the trade. i.e.
  - CVA at each time bucket = PV (EAD * (1 – Recovery Rate) * Probability of Default) where
    - EAD = Exposure at Default at each time bucket. This is predicted by EPE/ENE profiles
    - EPE/ENE = Expected Positive and Negative Exposures of the portfolio. These are generated using the market implied volatilities of market risk factors
    - Recovery Rate = 50% (Assumed)
    - Probability of Default = Derived through market CDS spreads

Credit Valuation Adjustment (CVA) – Valuation Approaches

- **Relative fair value approach** — the entity allocates a portion of the portfolio-level credit adjustment to each derivative asset and liability based on the relative fair value of each of the derivative to the fair value of the portfolio.
- **In-exchange or full credit approach** — the entity uses the derivative‘s stand-alone fair value (in-exchange premise), which would take into account the credit standing of the parties and ignore the effect of the master netting arrangement. The benefit of this model is that it avoids the complexity of an allocation.
- **Relative credit adjustment approach** — the entity allocates a portion of the portfolio-level credit adjustment to each derivative asset and liability based on the relative credit adjustment of each of the derivative instruments to the portfolio. This approach would require use of an in-exchange premise to calculate a credit adjustment for each instrument.
- **Marginal contribution approach** — the entity allocates a portion of the portfolio-level credit adjustment to each derivative asset and liability, based on the marginal amount that each derivative asset or liability contributes to the portfolio-level credit adjustment.

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