

How The Great Financial Crisis Of 2008 Changed The Derivatives Business Forever – A Brief Introduction To XVAs!

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Traditionally, the valuation of any derivative is based on the cost of constructing a portfolio that attains the same payoff as the derivative, under any realized market condition. However, regardless of whether the portfolio replicates the payoff perfectly or not, there are various factors that this approach misses, something that was brought to light by the Great Financial Crisis of 2008. In other words, 2008 opened our eyes to risks that had always been there, but had somewhat ignored (or even accepted), and shifted the business from “money at any risk” to “money with manageable risk”.

Consequently, the market moved to make a bunch of adjustments to ascertain the true cost of doing this business by accounting for the cost of counterparty default, of funding the position, of margin, etc. These adjustments came to be known as Cross-Valuation Adjustments or XVA. XVA began with Credit Valuation Adjustment (CVA), followed by Debit Valuation Adjustment (DVA) and Funding Valuation Adjustment (FVA). Now we have Margin Valuation Adjustment (MVA) and Capital Valuation Adjustment (KVA) as well. The list is getting longer. A brief introduction to these adjustments:

- First, the counterparty with which one transacts can default, and if so, the payoff will not be realized. This externality has to be incorporated in the valuation by augmenting the payoff to take account of default. For instance, one can hedge for default risk via Credit Default Swaps, locking in the cost. Thus, we get Credit Valuation Adjustment (or CVA).
- Second, with a clear recognition of the vulnerability of banks during the crisis, its default risk is also to be taken into account. Hence, we get Debt Valuation Adjustment (or DVA).
- Third, since derivatives pricing is about estimating the cost of setting up a replica portfolio, then the cost of funding should be an essential part of the price. Pre-2008, it was (wrongly) assumed that highly-rated institutions can fund uncollateralized borrowing close to the risk-free rate and term funding for different periods would not incur a large spread. But during the 2008 crisis, with banks under pressure, counterparty credit risks surfaced, financial institutions tried to retain cash (the ones that had any), leading to short-term funding drying up completely. As a result, funding spreads for banks (like Libor-OIS), which had always been an afterthought, widened ~350bps. This is when FVA became a widely accepted part of the business. FVA, or Funding Value Adjustment is basically about incorporating the cost at which the bank can fund collateral, when necessary, as a spread over the risk-free rate, since it would be compensated for the collateral at that rate.
- Fourth, the crisis led to regulators seeking to reduce counterparty risk by requiring more derivatives to be cleared on exchanges with either the exchange being a party to both sides of the deal or for the positions that are not exchange cleared, to post initial margin to an independent third party, which lead to another business cost – Margin Valuation Adjustment (or MVA).
- Finally, capital requirements have been raised significantly post 2008 to ensure financial institutions have enough buffer to deal with losses from market risk or counterparty credit risk. This comes in the form of tweaks to “risk-weighted assets” as well as higher capital requirements as a percentage of risk-weighted assets. KVA or Capital Value Adjustment is

essentially the cost of raising money from shareholders whereas FVA is the cost of raising money from lenders. For banks with approval to use the Internal Models Method, capital is based on a regulatory formula that takes account of EAD (exposure at default), M (effective maturity), LGD (loss given default), and PD (probability of default). LGD and PD are attributes related to the counterparty, while M and EAD are attributes related to the derivative.

All of this has had a drastic impact on the derivatives business, leading to either innovation like the advent of mark-to-market cross-currency swaps, or a decline in business for other products.

Note that CVA is theoretically hedge-able using CDS, although there are practical constraints based on the availability of CDS referencing the concerned counterparties. By hedging CVA, the bank is protected from loss due to counterparty default. If not dynamically hedged, CVA risk is warehoused on the balance sheet, and a part of the profit is set aside to account for realized losses from counterparty default. The situation is similar for other XVA components as well, and hence most banks have an XVA desk set up to manage/hedge these risks or at least calculate adjustments necessary in derivatives valuation.