Learning Curve®

CVA, DVA & Bank Earnings

Credit value adjustment is the amount subtracted from the mark-to-market (MTM) value of derivative positions to account for the expected loss due to counterparty defaults. CVA is easy to understand in the context of a loan–it is the loan principal less anticipated recovery, times the counterparty's default probability over the term of the loan. For derivatives, the loan amount is the net MTM value of derivative positions with that counterparty.

Calculating CVA for derivatives is complex because the MTM value changes through time depending on the path of the underlying market rates, such as interest rates, fx rates and commodity prices. Since the MTM value can fluctuate in either party's favor, both institutions may be exposed to default risk. To compound the complexity, the counterparty's default probability, typically implied from credit spreads - and the recovery rate, typically assumed fixed—may be correlated to the other market risk factors.

Debt value adjustment is simply CVA from the counterparty's perspective. If one party incurs a CVA loss, the other party records a corresponding DVA gain. DVA is the amount added back to the MTM value to account for the expected gain from an institution's own default. Including DVA (in addition to CVA) is intuitively pleasing because both parties report the same credit adjusted MTM value. DVA is also controversial because institutions record gains when their credit quality deteriorates, creating perverse incentives and these gains can only be realized in the event of a default.

Accounting rules mandate the inclusion of CVA in MTM reporting - IAS 39 (2005) and FAS 157 (2007)—which means bank earnings are subject to CVA volatility. To mitigate CVA volatility, as well as hedge default risk, many banks buy credit default swap (CDS) protection on their counterparties. Some banks further stabilize CVA by hedging the other market risk factors that affect CVA through the MTM value.

DVA is also accepted under the accounting rules and banks that include it add their own credit spread as a source of earnings volatility. Hedging DVA is not as straightforward. Since DVA increases as the bank's credit spread widens, it is equivalent to the bank being short its own debt. Therefore, hedging involves going long the bank's debt. Buying back debt requires financing, so some banks prefer using CDS. Since banks can't sell protection on themselves, they sell protection on highly correlated institutions, i.e., other banks, generating additional correlation and basis risks.

Most of the concepts summarized above recently drew attention when banks announced third quarter earnings. This Learning Curve highlights some of the results reported by larger banks and potential implications going forward.

Q3 Earnings

Most banks reported large DVA gains for the third quarter. These gains were offset to some extent by CVA losses but because bank spreads moved relatively wider, DVA was significantly higher than CVA. The following table shows Q3 DVA results for the five largest U.S. banks, along with the increases in their respective CDS spreads that drove these gains.

If bank spreads tighten over the fourth quarter, these DVA gains will turn into losses. Ironically, DVA gains pushed earnings above estimates in some cases, improving the outlook which in turn will cause DVA losses. The table below shows how much bank spreads have tightened during October and the estimated monthly DVA loss. The change in DVA is roughly proportional to the change in CDS.

Bank	June CDS (bps)	Sep CDS	Δ CDS	DVA Gain ($B)
Bank of America	158	426	268	1.700
Citigroup	137	319	182	1.888
Goldman Sachs	137	330	193	0.450
JP Morgan	79	163	84	1.900
Morgan Stanley	162	492	330	3.400

Bank	Sept CDS (bps)	Oct CDS	Δ CDS	DVA Loss ($B)
Bank of America	426	343	-83	(0.525)
Citigroup	319	232	-87	(0.898)
Goldman Sachs	330	288	-42	(0.097)
JP Morgan	163	140	-23	(0.525)
Morgan Stanley	492	347	-145	(1.496)

While CDS spreads for all five banks have roughly moved in tandem, DVA gains were substantially different. For example, CDS spreads of **Citigroup** and **Goldman Sachs** were almost identical at the start and end of the third quarter but their DVA results were very different. A similar situation occurred with **Morgan Stanley** and **Bank of America**, making it difficult to derive any definitive conclusions. The next two sections attempt to shed some light on portfolio dynamics and the effects of hedging.

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Earnings Implications

Detailed projections for Q4 are difficult to make due to the dependency on portfolio composition but it is possible to make some reasonable inferences. Since over 80% of derivatives are interest rate products (2011 OCC report), each bank's portfolio can be represented as a single interest rate swap for analysis purposes.

The second column in the table below shows the implied notional amount of a five-year payer interest rate swap that generates the reported DVA gain for each bank, based on the bank's starting and ending CDS spread. The relatively short five-year maturity was assumed due to increased use of early termination options, generally shortening the risky duration of bank portfolios. Payer swaps were assumed because banks commonly convert fixed rate bonds issued by corporate customers into floaters.

The swap notional amounts were then used to estimate the last three columns of the table. The 3-month DVA Value at Risk (VaR) establishes a range within which the quarterly change in DVA will stay with 99% probability. Since each bank's portfolio was 'replicated' as a swap, only interest rate movements were considered in calculating these VaR results. The final two columns give the implied standard deviation of the three-month and daily DVA based on the assumption of a normal distribution.

Bank	Implied 5Yr Payer Swap Notional ($B)	3Mo DVA VaR ($M)	3Mo DVA Std Dev ($M)	Daily DVA Std Dev ($M)
Bank of America	1,859	499	215	27
Citigroup	2,910	585	252	32
Goldman Sachs	657	137	59	7
JP Morgan	5,894	606	260	33
Morgan Stanley	3,091	959	412	52

The table indicates that Bank of America's quarterly change in DVA due to interest rate volatility should not exceed USD499 million with 99% probability. Of course, the DVA will also change with their credit spread as explained in the previous section. Goldman attempts to minimize DVA gains and losses by hedging.

Hedging

Most large banks hedge CVA to mitigate default risk and manage regulatory capital. Some banks also hedge DVA in order to reduce earnings volatility. Goldman Sachs didn't report a DVA gain because they incurred a corresponding loss on their hedges. Since Goldman can't sell protection on itself, they sold protection on a basket of highly correlated names, i.e., the other big U.S. banks. This hedging strategy is effective as long as bank spreads remain highly correlated.

A more precise hedging strategy involves buying back debt. Negative MTM values from the perspective of banks are in effect loans that can be used to purchase debt. If the bank's credit spread widens, the DVA gain on the derivative liability is offset by the loss on the bonds (There may be slippage due to cash vs. CDS basis). This strategy has garnered support because it transforms DVA from a controversial and generally confusing concept into a funding issue.

As demonstrated in the VaR analysis, DVA is also subject to the volatilities of other market variables, e.g., interest rates. To fully flatten DVA, these other risk factors must be hedged and rebalanced on a regular basis. This is not only expensive but also extremely complicated due to second-order and non-fungible risks, such as correlations. In addition, Basel III does not give capital relief for market hedges.

As exemplified by a third of Morgan Stanley's net revenues coming from DVA, DVA will continue to be a significant part of bank earnings as long as spreads remain relatively high and volatile. If spreads tighten over the fourth quarter, DVA gains for Q3 will turn into losses unless banks hedge their credit spread and the underlying market risk factors that drive DVA.

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