Conforming CVA & DVA Calculations with Guarantee Valuations

The History and Use of Credit and Debit Value Adjustments

2017-10-26, by Gordon E. Goodman

Abstract

The following article shows the development of credit and debit value adjustments (CVA and DVA) within the field of quantitative risk analysis and as subsequently adopted and approved for use within standard financial reporting statements under the FASB rules. This article also highlights issues that arose from the use of DVA with non-derivatives under FASB's Fair Value Option. Finally, this article proposes a unified approach to measurement of contingent claims for CVA, DVA, and guarantee valuations using a three level hierarchy similar to the three levels established by FASB for fair value measurement generally (also known as mark to market or MTM measurement).

Keywords: Credit value adjustment (CVA), debit value adjustment (DVA), fair value option, mark to market, guarantee valuation, contingent claims, financial statements

History of CVA and DVA in Financial Reporting

In June 1998, the Financial Accounting Standards Board (FASB) adopted its landmark Financial Accounting Standard (FAS) 133 titled "Accounting for Derivative Instruments and Hedging Activities," which established the use of fair value (or mark to market) accounting for derivatives (effective as of June 1999).[1] At that time, FASB did not specifically address the question of "credit value adjustments" (or CVA), which were already in use by some quantitative risk analysts (though CVA was not prohibited under FAS 133). It was only during September 2006 (effective as of November 2007), during the period leading up to the Great Recession, that FASB introduced the "credit standing concept" (now known as CVA) through adoption of FAS 157 titled "Fair Value Measurements" and applied it to both assets and liabilities that qualified for fair value measurement and in particular to derivatives under FAS 133.

Though CVA can generally refer to adjustments for either assets or liabilities, in subsequent industry usage the CVA that is associated with liabilities has commonly been called a "debit value adjustment" or DVA. In other words, if an entity is owed money by its counterparty (resulting in an asset), the counterparty's creditworthiness is measured to calculate the CVA of that asset. By contrast, if an entity owes money to its counterparty (resulting in a debt), the entity's own creditworthiness is measured to calculate the DVA of that debt.

To complete the first part of this puzzle, In February 2007 (but effective as of November 2007), FASB adopted FAS 159 titled the "Fair Value Option," which allowed public entities to elect fair value treatment for certain financial instruments that did not otherwise qualify for fair value measurement under FAS 133. This set the stage for the controversy that would arise during the

[1] An earlier and different version of the derivatives rule, known as EITF Issue #98-10 "Accounting for Contracts Involved in Energy Trading and Risk Management Activities," was in place at the time of FAS 133's adoption.

period of the Great Recession when financial institutions that had elected to utilize the Fair Value Option were able to report surprising and counter-intuitive "profits" in their income statements arising from sharp increases in the DVA associated with a deterioration of the credit quality of their own financial liabilities (i.e., due to an increase in their likelihood of default). This was especially true and problematic during the period 2009-2010.

Two subsequent Accounting Standards Updates (ASUs) have clarified or modified certain aspects of this conceptual framework. ASU No. 2011-11 issued in December 2011 (effective January 2013) titled "Disclosures about Offsetting Assets and Liabilities" noted that offsetting calculations (including CVA/DVA adjustments) should be presented in both gross and net formats (so as not to understate the size of portfolio positions and also to harmonize U.S. and international standards). ASU No. 2016-01 titled "Recognition and Measurement of Financial Assets and Financial Liabilities" required that the change in fair value of a liability resulting from an increase in DVA for financial instruments covered by the Fair Value Option (i.e., the situation that arose early in the Great Recession) should be recorded under Other Comprehensive Income (or OCI) in the Balance Sheet, and should not be captured in the Income Statement. Please note however, that the change required by ASU No. 2016-01 does not become effective until December 2017 (more than nine years after the "start" of the Great Recession in September 2008).

The question of how best to measure CVA and DVA has generally been left to risk practitioners and accountants, and to the development of industry standards—there are no prescriptive methodologies set out by FASB in any of these standards or updates (though various examples of appropriate calculations have been provided in the FASB literature). A methodology based on the valuation of guarantees, proposed by this author in the January 2008 issue of GARP's "Risk Review" (described in my article titled "How to Value Guarantees" which can be found at http://garp.org/#!/risk-intelligence/all/all/a1Z1W000003rJ3Z), is here suggested as a best in class methodology for CVA/DVA calculations since it follows the same logical structure of the three fair value measurement "levels" set out by FASB in their original FAS 133 methodology.

Assuming that a CVA/DVA calculation is based on perfect (or zero risk) payment in full, then CVA/DVA calculations are a special case within the guarantee valuations methodology described in my earlier article. This is so because when calculating guarantee valuations, we can model them assuming either perfect guarantors (i.e., the zero risk case) or less than perfect guarantors. (Though there has been some discussion in risk and accounting literature about assuming other than zero risk levels for CVA/DVA calculations, I believe this constitutes an exception and not the rule for most companies.) The other differences for CVA/DVA calculations versus guarantee valuations are that CVA/DVA calculations are adjusted for collateral held as an offset and also by any issued guarantees that may reduce the credit risk.

One additional point to consider is that in the same way a guarantee always applies a "cost" to the party who receives the benefit, CVA/DVA calculations always "reduce" the value of the underlying asset or liability. In the case of a CVA calculation this means that the asset would be worth less to the entity than it would be worth without the CVA adjustment (unless there is no measureable credit risk), and for a DVA calculation this means that the debt would be worth less

to the counterparty than it would be without the DVA adjustment (again unless there is no measureable credit risk).

Finally, valuation of third party guarantees was established by FASB in November 2002 (effective December 2002) in FASB's Interpretation No. 45 (known as FIN 45 "Guarantor's Accounting and Disclosure Requirements for Guarantees, Including Indirect Guarantees of Indebtedness of Others"). This followed issuance of FAS 133 in 1998, the standard requiring use of fair value for derivatives, but predates the issuance of the fair value measurement standard FAS 157 in 2006. Please note that FIN 45 only applied to guarantees issued by an entity that guaranteed the obligations of a third party, and did not apply to guarantees issued by an entity that guaranteed the obligations of a wholly owned subsidiary. Also, FIN 45 did not apply to guarantees received by an entity. Though FIN 45 only applied to certain guarantees, my 2008 article provides a generic framework for the valuation of any guarantee.

Names of Standards under the New FASB Codification

Before going into more detail, it is first appropriate to translate the names of the original FAS standards into the new FASB codification system. Though this is a little confusing, it will be necessary in order to track any future changes in these areas. In general, FASB has adopted the form and content of the original standards, but then has continued to issue updates, changes, and clarifications as new questions arise.

So to begin, FAS 133 (the Derivatives and Hedging standard) is now known within FASB's codification as Accounting Standards Codification (or ASC) 815 and is still titled "Derivatives and Hedging." FAS 157 (the Fair Value Measurement standard) is now known as ASC 820 and is still titled "Fair Value Measurement." FAS 159 (the Fair Value Option standard) is now known as ASC 825-10-05 and is a sub-topic titled "The Fair Value Option." ASU No. 2011-11 (the Offsetting update) is now known as sub-topic ASC No. 210-20 titled "Offsetting." ASU No. 2016-01 (the update that modifies the recording of DVA from fair value options measurements in OCI) is now known as sub-topic ASC 825-10-45-5 titled "Financial Liabilities for Which Fair Value Option is Elected." FIN 45 (the guarantees interpretation) is now known as ASC 460 and is titled "Guarantees."

The following is a graphic representation of the changed names at FASB for these standards, interpretations, and updates under FASB's new codification system:

Adoption	Effective	Old Number	Old Name	New ASC Nmber
Jun-98	Jun-99	FAS 133	Accounting for Derivative Instruments and Hedging….	ASC 815
Sep-06	Nov-07	FAS 157	Fair Value Measurements	ASC 820
Feb-07	Nov-07	FAS 159	The Fair Value Option	ASC 825-10-05
Dec-11	Jan-13	ASU No. 2011-11	Disclosures about Offsetting Assets and Liabilities	ASC No. 210-20
Jan-16	Dec-17	ASU No. 2016-01	Measurement of Financial Assets and Liabilities	ASC 825-10-45-5
Nov-02	Dec-02	FIN 45	Guarantor's Accounting and Disclosure Requirements….	ASC 460

Use of Guarantee Valuation Methodology to Calculate CVA and DVA

The purpose of the CVA and DVA calculation as described by FASB is to show the effect of credit standing (either of the counter-party or the entity itself) on the value of assets and liabilities measured at fair value. This is basically the same methodology that we developed in 2008 for the calculation of a guarantee relating to the same obligation. To repeat, the valuation of guarantees and the calculation of CVA/DVA are different forms of credit spread/contingent claims measurement for the same transaction. A guarantee valuation that assumes the zero risk case (payment in full) is equal to the CVA/DVA calculation for an asset (CVA) or a liability (DVA) adjusted for any offsetting collateral held or guarantees received.

As noted in my earlier article on guarantee valuation, the current approach is based on two underlying principles for both guarantee valuation and the calculation of CVA and DVA. First, the value of a risk-free transaction is equal to the value of a risky transaction plus the value of the guarantee or the amount of the discount calculated for CVA and DVA. This relationship, which combines the risky transaction with the guarantee or the CVA/DVA discount results in a synthetic risk-free transaction, can be stated as:

1. *Value of Guarantee or CVA/DVA Discount = Value of Risk-Free Transaction - Value of Risky Transaction*

The second basic valuation principle is that the value of any contingent liability, including guarantees or their equivalents stated as CVA or DVA, equals its expected present value. As defined by FASB, the expected present value is "the sum of the probability-weighted present values in a range of estimated cash flows, all discounted using the same interest rate convention." Therefore, according to this principle:

2. *Value of Guarantee or CVA/DVA Discount = Present Value of the Probability-Weighted Estimated Cash Flows*

Our approach also employs the FASB's so-called fair value hierarchy in the selection of the valuation method and the inputs used to calculate the fair value. This hierarchy is described in FAS 157. (Please note, however, that FAS 157 does not specifically address guarantees though it does discuss credit standing and credit valuation discounts.) There are three levels in FASB's fair value hierarchy:

- *Level 1: Models and values based on external, quoted prices in active markets for identical assets/liabilities.*
- *Level 2: Models and values based on external, quoted prices for similar assets/liabilities (with adjustments).*
- *Level 3: Models and values based on internal inputs.*

Three Valuation Methods for Guarantees and CVA/DVA Discounts

Based on the principles described earlier, which in turn are based on FASB's three level hierarchy for fair value measurement, three methods of valuing both guarantees and CVA/DVA have been developed:

Table 1: Guarantee and CVA/DVA Valuation Methods

Method	Guarantee or CVA/DVA Equals	Key Inputs/Assumptions	Applies To
Market Value	• fee received … or difference in market value of guaranteed debt and non-guaranteed debt.	• guarantee fees … or market value of debt with and without guarantees.	• sovereign debt. • bank deposit insurance.
Credit Spread	• difference in present value of the transaction's cash flows when discounted at the guaranteed and risky rates.	• risky (i.e., non-guaranteed) discount rate • risk-free (i.e., guaranteed) discount rate.	• default-triggered guarantees with simple payout structures.
Contingent Claims	• present value of the probability-weighted estimated cash flows.	• all payout scenarios identified. • probability of each scenario.	• default-triggered with atypical payout structures.
		• all payout scenarios identified. • probability of each scenario. • correlations (if any) among scenarios.	• multiple-trigger guarantees.

If a guarantee that is to be valued or a CVA/DVA that is to be calculated has characteristics that would allow it to be valued with all three of these methods, then each method should produce a similar value. These three methods are described in far greater detail (including formulas and examples) in my 2008 article, which is available in the White Papers department of GARP's Risk Intelligence web site (http://garp.org/#!/risk-intelligence/all/all/a1Z1W000003rJ3Z).

Unified Approach to Market and Credit Risk

The goal of establishing a unified approach to measurement of market and credit risk is to be applauded, and a method for establishing a three level hierarchy for CVA/DVA calculations (similar to FASB's three level hierarchy for fair value calculations) is specifically offered in this article. This method of calculating CVA/DVA value is also consonant with the guarantee valuation methodology that I described in my 2008 article. It still needs to be acknowledged

however that market risk (with its MTM calculations) is significantly different from credit risk (with its CVA/DVA calculations and guarantee valuations).

When looking at market risk and the change in MTM value, it is the entire pool of producers and consumers in the relevant market (i.e., a macrocosm) that determines the demand/supply relationship, and this in turn is what drives a change in price. By comparison, when looking at credit risk and the change in CVA/DVA values, it is the specific entity and the specific counter-party (i.e., a microcosm) that determines their respective probabilities or likelihoods of default, and this is what drives a change in their creditworthiness. We should continue to try to conform whatever can be logically harmonized, like the three level hierarchy used for valuations in both market and credit risk, but we should not try to gloss over real and meaningful differences in these risks.

Gordon Goodman has held senior positions at E.I. DuPont de Nemours, Conoco, Occidental, and NRG, and he has also served on both the Houston Area Urban League Board of Directors and the University of Houston's College of Arts & Sciences Advisory Board where he was Chairman. He has worked on committees of the Financial Accounting Standards Board (including the Energy Trading Working Group and the Valuations Resource Group) and the American Petroleum Institute where he served as Chairman of the Risk Control Committee. He lives in Houston, TX, and is currently a candidate for Justice on the 1st Court of Appeals in Texas.