Chapter 22

CVA and DVA

22 Credit Value Adjustments and Funding

For years, a practice in the financial industry has been to mark derivatives portfolios to market without considering counterparty risk. All cash flows were discounted using the LIBOR or another "risk-free" curve. However, the true portfolio value must incorporate the possibility of losses due to counterparty default. This observation has gained wider recognition following the high-profile defaults of 2008. The Credit Value Adjustment is by definition the difference between the risk-free portfolio and the true portfolio value which should take into account the possibility of counterparty defaults. In other words, CVA represents the monetized value of the counterparty credit risk.

22.1 Definitions of CVA and DVA

When reporting the fair value of any derivative position, we also need to consider counterparty credit risk (CCR). This is done by an adjustment to the value, known as the **Credit Value Adjustment (CVA)**.

A pure definition can be written as

CVA = Discounted expected exposure x Default probability x Loss given default

For symmetry reason, we also need to consider the bilateral nature of CCR. This means that an institution would calculate a CVA under the assumption that they, as well as their counterparty, may default. A defaulting institution "gains" on any outstanding liabilities that cannot be paid in full. This component is often referred to as **debt value adjustment (DVA)**.

The justification for using DVA is that a bank could buy back its debt cheaply to realize DVA gains, but no firm has actually done this.

22.2 Standard approach

To study CVA and DVA we consider the simplest deal we can think of, a loan where the premium paid for an amount K at time T is equal to the risk-free price minus CVA. This is

$$P = e^{-rT}K - CVA_L$$

where

$$CVA_L = E\left[e^{-rT}K \cdot 1_{\{\tau(B)\leq T\}}\right] = e^{-rT}K \cdot Q\left[\tau(B) \leq T\right] = e^{-rT}K \cdot \left[1 - e^{-\pi(B)T}\right]$$

Here, we denote the lender with L. $\tau(B)$ is **time to default** for the Borrower (B), and $\pi(B)$ the **CDS spread** for the Borrower. Here we used the definition of the **default probability**

$$Q_D(\tau(B) > T) = E\left[1_{\{\tau(B)>T\}}\right] = e^{-\pi(B)T}$$
$$\Leftrightarrow$$
$$Q_D(\tau(B) \leq T) = E\left[1_{\{\tau(B)\leq T\}}\right] = 1 - e^{-\pi(B)T}$$

If we have a certain recovery rate R, the formula above should be

$$Q_D(\tau(B) \leq T)E\left[1_{\{\tau(B)\leq T\}}\right] = \frac{1 - e^{-\pi(B)T}}{1 - R}.$$

For the Borrower we have

$$P = -e^{-rT}K + DVA_B$$

The present values of all cash-flows are given by

$$V_L = e^{-rT}K - CVA_L - P$$

$$V_B = -e^{-rT} K + DVA_B + P$$

To get an agreement between the borrower and the lender we need $V_L = V_B$. We then have

$$2P = 2e^{-rT} K - CVA_L - DVA_B$$

With $DVA_L = CVA_B$ we get

$$P = e^{-rT} K - e^{-rT} \left[1 - e^{-\pi(B)T}\right] = K \cdot e^{-(r+\pi(B))T}$$

This is the agreed price between the borrower and the lender. But something is missing here. We need to know about the liquidity. The lender needs to finance the amount until maturity at a **funding spread** $s(L)$ but the borrower can reduce his funding cost with P. The borrower should therefore see a funding benefit, and the lender should see that the fair value of the claim reduced by the funding cost. Therefore, the effect of this funding cost seems to be missing in the above formula.

22.3 Approach including liquidity

One method is to introduce DVA as a **liquidity cost** by adjusting the discounting term and introduce the possibility of defaulting on the payoff. This means that we need to replace the term $e^{-rT} K$ above with $e^{-(r+s(L))T} K \cdot 1_{\{\tau(B)>T\}}$ and get

$$\begin{aligned} V_L &= E\left[e^{-(r+s(L))T} K \cdot 1_{\{\tau(B)>T\}}\right] - P = E\left[e^{-(r+\pi(L)+\gamma(L))T} K \cdot 1_{\{\tau(B)>T\}}\right] - P \\ &= e^{-(r+\pi(L)+\gamma(L))T} \cdot K \cdot e^{-\pi(B)T} - P \equiv e^{-(r+\pi(L)+\pi(B)+\gamma(L))T} \cdot K - P \end{aligned} \quad (22.1)$$

Here $\gamma(L)$ is the **deterministic default intensity** for the lender, L

$$s(X) = \pi(X) + \gamma(X);\ X = \{B, L\} .$$

Similar, for the borrower B we have

$$\begin{aligned} V_B &= -E\left[e^{-(r+s(B))T} \cdot K \cdot 1_{\{\tau(B)>T\}}\right] + P = -E\left[e^{-(r+\pi(B)+\gamma(B))T} \cdot K \cdot 1_{\{\tau(B)>T\}}\right] + P \\ &= -e^{-(r+\pi(B)+\gamma(B))T} \cdot K \cdot e^{-\pi(B)T} + P \equiv -e^{-(r+2\pi(B)+\gamma(B))T} \cdot K + P \end{aligned} \quad (22.2)$$

When comparing this result with the previous section, it is convenient to confine ourselves to the simplest situation where the lender is default-free with no liquidity spread, while the borrower is defaultable with the minimum liquidity spread allowed, the CDS spread. In this case we have: ($s(L) = 0$, $s(B) = \pi(B) > 0$) and we get

$$V_L = e^{-(r+\pi(B))T} K - P$$

$$V_B = -e^{-(r+2\pi(B))T} K + P$$

Here we observe two bizarre aspects. First, even in a situation where we have assumed no liquidity spread the two counterparties cannot agree on the simplest transaction with default risk. A day-one profit should be accounted for by borrowers in all transactions with CVA. This contradicts market reality.

Secondly, the explicit inclusion of the DVA term results in a duplication of the funding benefit for the party that assumes the liability. Against all evidence the formula implies that the funding benefit is remunerated twice. If this were correct then a consistent accounting of liabilities at fair value would require pricing zero-coupon bonds by multiplying twice their risk-free present value by their survival probabilities.

22.4 How to make it right

To solve this in a right way, we do not calculate the liquidity by the adjusted discounting approach.as in Equation (22.1) and (22.2). Instead, we generate the liquidity costs and the benefits by modelling explicitly the **funding strategy** Here we take into account how the companies capitalize and discount money with the risk-free rate r, and then add or subtract the actual credit and funding costs that arise in the deal.

This allow us to introduce explicitly both credit and liquidity and to investigate more precisely, where credit/liquidity gains and losses are financially generated. We take into account that the above deal has two legs.

If we consider the Lender, one leg is the **deal leg**, with net present value

$$E\left[-P + e^{-rT}\Pi\right]$$

Here Π is the payoff at T, including a potential default indicator. The other leg is the **funding leg** with the net present value

$$E\left[+P - e^{-rT}F\right]$$

where F is the funding payback at T, including a potential default indicator. When there is no default risk or liquidity cost involved, this funding leg can be overlooked because it has a value of $E\left[+P - e^{-rT} e^{rT} P\right] = 0$. In the general case the total net present value is

$$V_L = E\left[-P + e^{-rT}\Pi + P - e^{-rT}F\right] \equiv E\left[e^{-rT}\left(\Pi - F\right)\right]$$

Thus, the premium at time 0, cancels out with its funding and we are left with the discounting of a total payoff including the deal's payoff and the liquidity payback. An analogous relationship applies for the borrower, as will be described below.

When we continue, we work under the hypothesis that all liquidity management happens in the cash market. Then, the funding is made by issuing bonds and excess funds are used to reduce or to avoid increasing the stock of bonds. This is the most natural assumption since it is similar to the assumption that banks make in their internal liquidity management, namely, what the treasury desk assumes in charging or rewarding trading desks.

22.4.1 Risky Funding with DVA for the borrower

The borrower has a liquidity advantage from receiving the premium P at time zero, as it allows him/her to reduce the funding requirement by an equivalent amount. The amount P generates a negative cashflow at T, when funding must be paid back. This is equal to

$$-P \cdot e^{rT} e^{s(B)T} \cdot 1_{\{\tau(B)>T\}}$$

This future outflow equals P, capitalized at the funding cost, times a default indicator. We need to include a default indicator because in case of default and zero recovery. During default, the borrower does not pay back the borrowed funding and there is no outflow. Thus reducing the funding by P, corresponds to receiving at T a positive amount equal to

$$P \cdot e^{rT} e^{s(B)T} \cdot 1_{\{\tau(B)>T\}} = \left\{s(B) = \pi(B) + \gamma(B)\right\} = P \cdot e^{rT} e^{\pi(B)T} e^{\gamma(B)T} \cdot 1_{\{\tau(B)>T\}} \quad (22.3)$$

Thus, the total payoff at T is

$$P \cdot e^{rT} e^{\pi(B)T} e^{\gamma(B)T} \cdot 1_{\{\tau(B)>T\}} - K \cdot 1_{\{\tau(B)>T\}}$$

Taking discounted expectation, we get

$$V_B = e^{-\pi(B)T} \cdot P \cdot e^{\pi(B)T} e^{\gamma(B)T} - e^{-rT} \cdot K \cdot e^{-\pi(B)T} = P \cdot e^{\gamma(B)T} - K \cdot e^{-(r+\pi(B))T}$$

Compared with Equation (22.2), ($P - K \cdot e^{-(r+2\pi(B)+\gamma(B))T}$) we have no unrealistic double-accounting of default probability. Also notice that

$$V_B = 0 \quad \Rightarrow \quad P_B = K \cdot e^{-rT} e^{-\pi(B)T} e^{-\gamma(B)T} \tag{22.4}$$

where P_B is the **breakeven premium** for the borrower, in the sense that the borrower will find this deal convenient as long as $V_B \geq 0 \Rightarrow P \geq P_B$. Compared with Equation (22.2) i.e. the standard DVA with liquidity where we observe the double counting

$$V_B = 0 \quad \Rightarrow \quad P_B = K \cdot e^{-rT} e^{-2\pi(B)T} e^{-\gamma(B)T}$$

As before, assuming

$$P_B = K \cdot e^{-(r+\pi(B))T}$$

we may conclude that, in this case the computation from the standard CVA is correct, because it is taking into account the probability of default in the valuation of the funding benefit, which removes any liquidity advantage for the borrower.

Equation (22.4) shows what happens when, in addition there is a **pure liquidity basis** component in the funding cost. On the other hand, charging liquidity costs with an adjusted funding spread cannot be naturally extended to the case where we want to observe explicitly the possibility of default events in our derivatives.

In writing the payoff for the borrower we have not explicitly considered the case in which the deal is interrupted by the default of the lender, since we can replace the deal with a new counterparty. This keeps V_B independent of the default time of the lender, consistently with the reality of bond and deposit markets.

22.4.2 Risky Funding with CVA for the lender

If the lender pays P at time 0, he incurs a liquidity cost. In fact, he needs to finance (borrow) P until T. At T, the lender will pay back the borrowed money with interest, but only if he has not defaulted. Otherwise, he gives back nothing, so the outflow for the lender is

$$P \cdot e^{rT} e^{s(L)T} \cdot 1_{\{\tau(L)>T\}} = P \cdot e^{rT} e^{\pi(L)T} e^{\gamma(L)T} \cdot 1_{\{\tau(L)>T\}}$$

while he receives in the deal $K \cdot 1_{\{\tau(B)>T\}}$. The total payoff at T is therefore

$$-P \cdot e^{rT} e^{\pi(L)T} e^{\gamma(L)T} \cdot 1_{\{\tau(L)>T\}} + K \cdot 1_{\{\tau(B)>T\}}$$

Taking discounted expectation we get

$$\begin{aligned} V_L &= -P \cdot e^{-\pi(L)T} e^{\pi(L)T} e^{\gamma(L)T} \cdot 1_{\{\tau(L)>T\}} + e^{-rT} e^{-\pi(B)T} K \\ &= -P \cdot e^{\gamma(L)T} \cdot 1_{\{\tau(L)>T\}} + e^{-(r+\pi(B))T} K \end{aligned}$$

The condition that makes the deal convenient for the lender is

$$\begin{aligned} &V_L \geq 0 \quad \Rightarrow \quad P \leq P_{L,} \\ &P_L = K \cdot e^{-rT} e^{-\pi(B)T} e^{-\gamma(L)T} \equiv K \cdot e^{-(r+\pi(B)+\gamma(L))T} \end{aligned}$$

where P_L is the breakeven premium.

It is interesting to note that when the lender computes the value of the deal and takes into account all future cashflows as they are seen from the counterparties, the valuation does not include a charge to the borrower for the component $\pi(L)$. This term, the cost of funding would be associated with his own risk of default. This term is cancelled by the fact that funding is not given back in case of default.

In terms of relative valuation of a deal, this fact about the lender is exactly symmetric to the fact that for the borrower, the inclusion of the DVA eliminates the liquidity advantage associated with $\pi(B)$. In terms of managing cashflows, instead, there is an important difference between the parties, which is discussed below. For reaching an agreement in the market, we need

$$V_L \geq 0, \quad V_B \geq 0$$

which implies

$$\begin{aligned} &P_L \geq P \geq P_B \qquad \Leftrightarrow \\ &K \cdot e^{-rT} e^{-\pi(B)T} e^{-\gamma(L)T} \geq P \geq K \cdot e^{-rT} e^{-\pi(B)T} e^{-\gamma(B)T} \\ &\Rightarrow \\ &\gamma(B) \geq \gamma(L) \end{aligned}$$

This solves the problem, and shows that, if we only want to guarantee a positive expected return from the deal, the liquidity cost that needs to be charged to the counterparty of an uncollateralized derivative transaction is just the liquidity basis, rather than the bond spread or the CDS spread.

This is in line with what actually happened during the liquidity crisis in 2007-2009, when the bond-CDS basis exploded. Below we also show how the picture changes when we look at the possible realized cashflows (as opposed to the expected cashflows).

22.4.3 Positive recovery

Now, we study what happens if we relax the assumption of zero recovery. The discounted payoff for the borrower is now

$$e^{-rT}\left(P\cdot e^{rT}e^{\pi(B)T}e^{\gamma(B)T}-K\right)\cdot 1_{\{\tau(B)>T\}}+R_B\cdot e^{-rT}\left(P\cdot e^{rT}e^{\pi(B)T}e^{\gamma(B)T}-K\right)\cdot 1_{\{\tau(B)\le T\}}$$

$$\Rightarrow$$

$$e^{-rT}\left(P\cdot e^{rT}e^{\pi(B)T}e^{\gamma(B)T}-K\right)\cdot\left((1-1_{\{\tau(B)\le T\}})+R_B\cdot 1_{\{\tau(B)\le T\}}\right)$$

$$\Rightarrow$$

$$\left(P\cdot e^{\pi(B)T}e^{\gamma(B)T}-e^{-rT}K\right)\cdot\left(1-(1-R_B)(1-1_{\{\tau(B)>T\}})\right)$$

where the **recovery** is a fraction, R_B of the present value of the claims at the time of default of the borrower, consistent with standard derivative documentation. Notice that the borrower acts as a borrower both in the deal and in the funding leg, since we represented the latter as a reduction of the existing funding of the borrower. By taking the expectation at time 0 we obtain

$$V_B=\left(1-(1-R_B)S_B(T)\right)\cdot\left(P\cdot e^{\pi(B)T}e^{\gamma(B)T}-e^{-rT}K\right)$$

where $S_B(T)$ is the survival probability of B. Using $\pi(B)=\lambda(B)(1-R_B)$, we can apply a first order approximation

$$1-e^{-\pi(B)T}\approx(1-R_B)\cdot\left(1-e^{-\lambda(B)T}\right)$$

Here $\lambda(B)$ is the deterministic default intensity. Then

$$V_B\approx e^{-\pi(B)T}\cdot\left(P\cdot e^{\pi(B)T}e^{\gamma(B)T}-e^{-rT}K\right)=P\cdot e^{\gamma(B)T}-K\cdot e^{-(r+\pi(B))T}$$

Rather surprisingly, this is the same formula we found when we were studying the Risky Funding with DVA for the borrower!

Similar arguments apply to the value of the claim for the lender, which acts as a lender in the deal and as a borrower in the funding leg. For the lender we have

$$V_L=-P\cdot e^{\gamma(L)T}\cdot 1_{\{\tau(L)>T\}}+e^{-(r+\pi(B))T}K$$

is recovered as a first order approximation of

$$V_L=-\left(1-(1-R_L)S_L(T)\right)\cdot P\cdot e^{\pi(L)T}e^{\gamma(L)T}+\left(1-(1-R_B)S_B(T)\right)\cdot e^{-rT}K$$

22.4.4 Can DVA become a funding benefit?

One of the most controversial aspects of DVA concerns the consequences for the accounting of liabilities on the balance sheet. In fact, DVA enables the borrower to condition future liabilities on survival and create a benefit on default. However, liabilities are already reduced by risk of default in the case of bonds when banks use the *fair value option* according to international accounting standard, and when banks mark the bond liabilities at historical cost.

So, what is the meaning of DVA? Can we really observe a benefit in case of our own default?

In order to answer this question we need to study what happens if the borrower pretends to be default-free, thereby ignoring DVA.

The borrower can perform valuation for accounting purposes using an accounting credit spread $\pi(B)$ that may be different from the market spread and an accounting liquidity basis $\gamma(B)$ possibly different from the market one, albeit with the constraint that their sum $s(B)$ must match the market funding spread. In particular, when the party pretends to be default free, we have $\pi(B) = 0$ and $\gamma(B) = s(B)$, and there are no more indicators for our own default in the payoffs.

Assume that the borrower pretends, for accounting purposes, to have zero default risk. The premium P paid by the lender gives the borrower a reduction of the funding payback at T corresponding to a cashflow $P \cdot e^{rT} e^{s(B)T}$ at T, where there is no default indicator because the borrower is treating itself as default-free.

This cashflow must be compared with the payout of the deal at T, which is $-K$, again without indicator, i.e. without DVA. Thus the total payoff at T is

$$P \cdot e^{rT} e^{s(B)T} - K$$

By discounting to time 0 we obtain an accounting value V_B such that

$$V_B = P \cdot e^{s(B)T} - K \cdot e^{-rT}$$

which yields an accounting breakeven premium P_B for the borrower equal to the break-even in Equation (22.4),

$$P_B = K \cdot e^{-rT} e^{-\pi(B)T} e^{-\gamma(B)T} \equiv K \cdot e^{-(r+\pi(B)+\gamma(B))T}$$

where now $\pi(B)$ and $\gamma(B)$ are those provided in the market. So in this case too the borrower B sees a funding benefit that actually takes into account its own market risk of default $\pi(B)$, plus an additional liquidity basis $\gamma(B)$, thereby matching the premium computed by the lender that includes the CVA/DVA term. But now this term is accounted for as a funding benefit and <u>not</u> as a benefit coming from the reduction of future expected liabilities thanks to the risk of default.

This shows how the DVA term can be implemented. When a bank enters a deal in a borrower position, it is making funding for an amount as large as the premium. If this premium is used to reduce existing funding which is equally or more expensive, which in our setting means buying bonds or avoiding some issuance that would be necessary otherwise, this provides a real financial benefit that is enjoyed in the case of survival by a reduction of the payments at maturity. A bank can buy back its own bonds, which is like `selling protection on itself' fully funded. When a sale of protection is funded, there is no counterparty risk and therefore no limit to whom can sell protection, which is different from the case of an unfunded CDS. In fact buying their own bonds is a standard and important activity of banks.The reduction is given by the difference in $P \cdot e^{rT} e^{s(B)T} - K$.

If the quantity of outstanding bonds is sufficiently high to allow the implementation of such a strategy, we have shown how the DVA term can be seen not as a **default benefit**, but rather a natural component of fair value whenever fair value mark-to-market takes into account counterparty risk and funding costs.

22.4.5 The accounting view for the lender

The above results show that the borrower's valuation does not change if he considers himself default free by using an accounting credit spread $\pi(B) = 0$ and treating all the funding cost $s(B)$ he sees in the market as a pure liquidity spread $\gamma(B) = s(B)$. Do we have a similar property also for the lender? Not at all.

If the lender computes the breakeven premium using an accounting credit spread $\pi(L)$ and an accounting liquidity spread $\gamma(L) = s(L) - \pi(L)$ different from those provided by the market, he gets a different breakeven premium, because

$$P_L = K \cdot e^{-(r+\pi(B)+\gamma(L))T}$$

thus, the breakeven premium and the agreement that will be reached in the market depends crucially on $\gamma(L)$. Figure 22-1, for a sample deal, we show how P_L varies when, holding $s(L)$ fixed, we vary $\kappa(L) = \gamma(L)/s(L)$, which we call the **liquidity ratio** of the lender. This is not the only difference between the situation for the borrower and the lender. Notice that the borrower's net payout at maturity T is given by

$$P \cdot e^{(r+\pi(B)+\gamma(B))T} \cdot 1_{\{\tau(B)>T\}} - K \cdot 1_{\{\tau(B)>T\}}$$

and is non-negative in all states of the world if provided we keep $P \geq P_B$, although the latter condition was designed only in order to guarantee that the expected payout is non-negative. For the lender instead the payout at maturity is given by

$$-P \cdot e^{(r+\pi(L)+\gamma(L))T} \cdot 1_{\{\tau(L)>T\}} + K \cdot 1_{\{\tau(B)>T\}}.$$

The condition $V_L \geq 0$ does not imply the non-negativity of the expression above. In particular, we can have a negative carry even if we assume that both counterparties will survive until maturity.

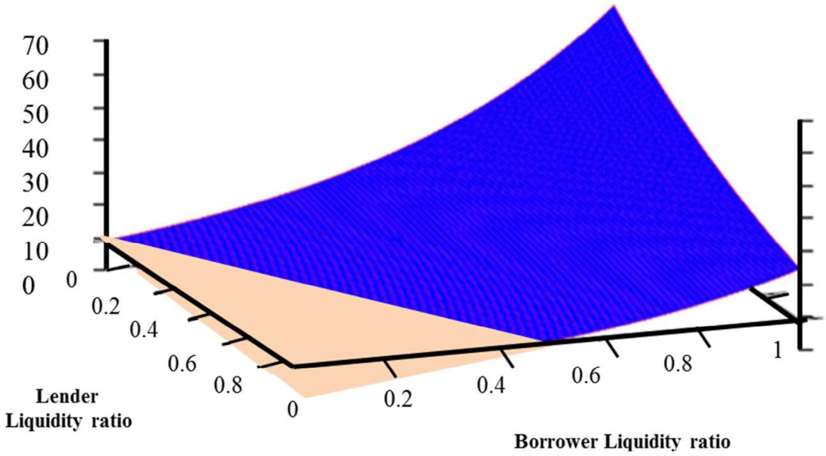

Figure 22-1 Breakeven premium for L, P_L as a function of the liquidity cost

The figure shows breakeven premium for the Lender P_L as a function of the liquidity cost ratios $\kappa(L)$ and $\kappa(B)$ when $s(L) = 0.05$, $s(B) = 0.1$, $T = 20$, $K = 100$, $r = 0.02$. The xy-plane crosses the z-axis at the breakeven premium for the Borrower P_B. A deal is possible only in the blue region.

If we want to guarantee a non-negative carry at least when nobody defaults we need $\pi(L) \leq \pi(B)$. Otherwise, the lender is exposed to liquidity shortages and a negative carry even if the deal is convenient for him. Liquidity shortages when no one defaults can be excluded by imposing for each deal $\pi(L) \leq \pi(B)$, or, with a solution working for whatever deal with whatever counterparty, by working as if the lender were default-free. Only if the lender pretends for accounting purposes to be default-free will the condition for the convenience of the deal based on expected cashflows be

$$P \leq K \cdot e^{-(r+\pi(B)+s(L))T} = K \cdot e^{-(r+\pi(B)+\gamma(L)+\pi(L))T}.$$

This clearly implies that

$$-P \cdot e^{(r+\pi(L)+\gamma(L))T} \cdot 1_{\{\tau(L)>T\}} + K \cdot 1_{\{\tau(B)>T\}}.$$

should be non-negative. On the other hand, the lender's assumption to be default-free makes a market agreement more difficult, since

$$K \cdot e^{-(r+\pi(B)+\gamma(B))T} \leq P \leq K \cdot e^{-(r+\pi(B)+\gamma(L)+\pi(L))T}.$$

implies

$$\gamma(B) \geq \gamma(L) + \pi(L)$$

rather than $\gamma(B) \geq \gamma(L)$. Under this assumption, uncollateralized payoffs should be discounted at the full funding cost also in our simple setting. Let us consider a bank X that pretends to be default-free and thus works under the assumption $\kappa(B) = \kappa(X) = 1$ when the bank X is a net borrower and $\kappa(L) = \kappa(X) = 1$ when X is in a lender position. When the bank is in the borrower position, we have

$$P_B = P_X = K \cdot e^{-(r+s(X))T} .$$

while when it is in a lender position with respect to a counterparty the breakeven premium will be given by

$$P_L = K \cdot e^{-(r+s(X))T} = P_B = P_X .$$

and the discounting at the funding rate $r + s(X)$ is recovered for both positive and negative exposures.

22.5 Final conclutions

The discussion above showed how a consistent framework for the joint pricing of liquidity costs and counterparty risk can be formulated. This was accomplished by explicitly modeling the funding components of a simplified derivative where both counterparties might default. We saw how bilateral counterparty risk adjustments (CVA and DVA) could be combined with liquidity/ funding costs without any unrealistic double counting effects.

We also found that DVA has a meaningful representation in terms of funding benefit for the borrower, so that a bank can take into account DVA and find an agreement with lenders computing CVA even when it neglects its own probability of default. On the other hand, the lender's cost of funding includes a component that is associated with his own risk of default, but this component cancels out with his default probability, so that only his liquidity spread (or equivalently his bond-CDS basis) contributes as a net funding cost to the value of the transaction.

We also discussed how the situation of the borrower and the lender were different; in particular, the lender could have negative carry upon no default even if the value of the deal was positive for him.

Thus, while the debate appears to be focused on the impact of accounting choices on the valuation of liabilities, the previous discussion illustrated that it is rather on the valuation of assets that such choices make a difference.