

An Overview of Collateralization Fundamentals & the ISDA Credit Support Annex

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Abstract

In this paper we discuss the continued transition of financial markets towards trade standardization and the clearing of transactions, outlining the role of central clearing counterparties CCPs in reducing systemic and idiosyncratic risks. We contrast this with a discussion on bespoke non-cleared bilateral trading, the associated credit risk management process and the charging of credit valuation adjustments termed collectively as XVA adjustments, with the principal credit valuation adjustment termed CVA.

The majority of trading counterparties require collateral to be posted to cover bilateral trading positions and have extensive legal documentation in place to govern the collateral calculation and transfer process, of which the ISDA Credit Support Annex or CSA agreement is the most common and market standard.

We discuss both the collateral posting process in detail and outline all the main important terminology and terms outlined in the ISDA CSA. Finally we outline trading features that require special considerations, namely trade break-clauses and physical and cash settlement features.

Keywords: Central Clearing Counterparty, CCP, Central Clearing House, Cleared Transactions, Bilateral Trading, Exposure Profiles, Netting Sets, Counterparty Valuation Adjustments, XVA, CVA, Collateralization, Break-Clauses, Physical and Cash Settlement, ISDA Master Agreement, Credit Support Annex, Credit Thresholds, Minimum Transfer Amounts, Initial Margin, Variation Margin, Collateral Rehypotheication

1 Introduction

Firstly we discuss the market transition to standardized and cleared transactions. Secondly we outline the purpose and role of central clearing counterparties CCP and consider non-cleared bespoke bilateral trading. The latter leads us rather naturally on to the topic of credit risk management and credit valuation adjustments, whereby counterparties make a variety of credit charges collectively referred to as XVAs, with the principal of these being a credit valuation adjustment also known as CVA for short.

The majority of trading counterparties require collateral to be posted to cover bilateral trading positions and have extensive legal documentation in place to govern the collateral calculation and transfer process. The most common and market standard legal documentation is the ISDA Credit Support Annex or CSA agreement.

We discuss both the collateral posting process in detail and outline all the main important terminology and terms outlined in the ISDA CSA. Finally we outline trading features that require special considerations namely trade break-clauses and physical and cash settlement features.

2 Central Clearing Counterparties, CCP

Since the credit crisis of 2007, the high profile collapse of Lehman Brothers and the subsequent bailout of several of the world's largest and most prominent investment and retail banks there has been much restructuring of the financial industry with an emphasis on regulation, transparency, credit and market risk management.

To this end the majority of standard vanilla banking transactions in the financial industry are no longer executed bi-laterally between two counterparties directly, but rather cleared, reported and risk managed via a central clearing counterparty (CCP) or central clearing house.

The CCP requires all trading counterparties deposit funds to cover systemic and idiosyncratic losses. Additionally counterparties are required to make initial margin and variation margin payments to cover daily incremental transaction profits and losses.

The role of the CCP is to reduce counterparty, operational, settlement, market, legal and default risk. The CCP becomes the counterparty or intermediary between the buyer and seller and guarantees the terms of the trade even if one party defaults. Another role of the CCP is to reduce the number of transactions and reduce credit exposure in the marketplace by full and partial netting of offsetting transactions. The netting process is greatly enhanced with the use of standardized contracts. Bespoke and highly customised transactions are undesirable for CCPs since they have cashflows and associated risks that can be rarely offset with or netted against other transactions.

3 Bespoke & Non-Cleared Bilateral Transactions

Bespoke or non-standardized transactions are generally traded directly between counterparties. Counterparties are then exposed to credit risk to each other. The risk of a counterparty default or not honouring the financial commitments of a contract is called counterparty credit risk. In most cases this risk is not considered via direct evaluation of a single trade, but rather the net exposure of the entire portfolio of trades between two counterparties referred to as the netting set. A counterparty's portfolio therefore needs to be adjusted appropriately to reflect credit default risk. This credit adjustment to the portfolio is referred to as the counterparty credit valuation adjustment or CVA for short.

4 Credit Valuation Adjustments, CVA

There are several categories of credit valuation adjustments collectively termed XVA. Here we focus on the principal credit valuation adjustment referred to as CVA. Credit valuation adjustments are not applied to transactions cleared with a central clearing house or CCP, such transactions are widely considered to have negligible credit risk. Counterparties however do calculate and apply credit valuation adjustments to bespoke uncleared transactions that are traded bilaterally.

Credit valuation adjustments are calculated on a portfolio level called the netting set. The credit risk exposure or exposure profile is then based on net current and future present value of all transactions within this portfolio or netting set over time. A positive PV exposure is considered a loan to the counterparty and a negative exposure considered as a borrowing of funds from the counterparty.

The credit valuation charge can be considered as the cost of purchasing a Credit Default Swap or insurance contract on the counterparty with the notional insured set to match the exposure profile of the netting set. We outline the basic summary of a CDS pricing calculation below for reference, however for more specific details on CDS pricing we refer the reader to [2] and [3].

A long or short CDS position refers to the underlying credit exposure or risk, so a long CDS position would imply being long the credit risk i.e. by being the seller of the protection leg and guaranteeing potential credit losses and vice versa for being short the CDS. Needless to say it does not make sense to sell protection on oneself¹ nor on highly correlated credit reference entities, although it is not unheard of for investors to try their luck and seek free protection premiums. A long CDS would be priced as

$$PV(CDS \text{ Contract}) = \phi \left[PV(Premium \text{ Leg}) - PV(Protection \text{ Leg}) \right]$$

where ϕ equals 1 for a long position and -1 for a short position and with the individual legs

¹Selling protection on oneself would imply in the event of default you would be unable to honour the necessary protection payment, since you are already in default.

being priced as²

$$PV(\text{Premium Leg}) = \sum_{i=1}^n N_i s \Delta t_i Q(t_i) P(t_0, t_i)$$

and

$$PV(\text{Protection Leg}) = \int_{s=t_0}^T N_s (1 - RR_s) \underbrace{Q(s) \lambda(s)}_{\mathbb{P}(\text{Default})} P(t_0, s) ds$$

where i represents the number of credit protection premium payments or coupons, s the CDS spread or protection premium in percent, Δt_i the coupon year fraction, $P(t_0, t_i)$ the discount factor for coupon i , N the notional amount to be protected or insured against loss, RR is the recovery rate in percent given a default, T the maturity of the protection contract, $Q(t)$ represents the cumulative probability of survival until time t , $\lambda(t)$ the instantaneous probability of default at time t and $\mathbb{P}(\text{Default})$ is the probability of default, which can be represented as $Q(t)\lambda(t)$ denoting that the underlying credit entity survives until time t and then immediately defaults.

5 Collateral Posting and the ISDA Credit Support Annex

To calculate the CVA charge for a bilateral trade we also need to examine and consider the trading portfolio and the netting set that the trade belongs to and the corresponding trading agreements and set of provisions governing the transaction between the two counterparties.

The International Swaps and Derivatives (ISDA) Master Agreement is one of the most established agreements used in the financial services industry. Counterparties can have more than one ISDA agreement per client however this is atypical. Trades under each ISDA agreement form one portfolio or netting set with no cross netting with trades in different portfolios governed by different master agreements allowed. ISDA Master Agreements typically allow for trades to be netted and therefore the evaluation of counterparty credit risk must be performed on a portfolio level and cannot be evaluated on an incremental trade by trade basis.

Although the ISDA Master Agreement reduces risk through the netting of trades within the portfolio governed by the agreement residual risks remain, which as parts of the portfolio mature can become substantial. To deal with the residual risk additional measures have been built into the ISDA framework to robustly manage this leftover risk. The main mechanism was for counterparties to post collateral to each other to cover potential trading losses and to annex the existing ISDA agreement with an additional agreement called the Credit Support Annex or CSA to govern the collateral posting process.

A CSA defines the legal terms under which collateral is posted between counterparties. We outline the main terms and features below.

1. **Agreement Type:** CSA agreements are often described as one-way or two-way. Collateral posting is required when the trade portfolio has a negative mark-to-market, MtM. A one-way agreement means only one of the trading counterparts needs to post collateral.

²We exclude the accrued interest term for simplicity.

A two-way agreement means both parties are required to post collateral when their trade portfolio has a negative MtM valuation.

2. **Threshold, H:** This is the credit line or the amount of credit a counterparty is willing to extend to another before collateral is due, which is often conditional on the credit-worthiness of the counterparty. If V_t is the trade value at collateral rebalancing date t then the collateral posted $C_t = \max(V_t - H, 0)$.
3. **Minimum Transfer Amount, MTA:** This is the buffer above the threshold to ensure collateral margin calls are only made if a reasonable price movement is breached. In the case of a non-zero MTA the collateral posted C_t would be

$$C_t = \begin{cases} V_t - H, & \text{if } V_t - H > MTA \\ 0, & \text{otherwise} \end{cases}$$

4. **Initial Margin, M:** Refers to the level of upfront collateral required to support a trading position as a credit cushion on top of the collateral obtained from the regular margining process for the client's trading portfolio. This acts as an additional counter-measure to protect against adverse price slippage in fast moving markets.
5. **Independent Amount, IA:** This is an extra amount that one party may require from the other to bolster an existing credit threshold to guard against residual counterparty credit risk.
6. **Rehypothecation:** If included in the CSA rehypothecation grants the collateral holder the right to re-use the collateral posted for it's own purposes. This is applies to both cash and security collateral.
7. **Eligible Securities:** This is the pool of securities eligible for collateral posting. The most common eligible securities are cash, highly liquid government and investment grade bonds.
8. **Haircuts:** This is the discount to be applied to each of the various eligible security types to allow for price volatility.
9. **Collateral Currency:** is the currency in which collateral must be denominated.
10. **Reference Date:** The start date of the margining process.
11. **Rebalancing Date:** The date on which the collateral calculation takes place.
12. **Settlement Lag, τ_s :** The time interval between the rebalancing date and the corresponding collateral posting date.
13. **Rebalancing Interval, τ_r :** The time period between collateral rebalancing dates.
14. **Closeout Period, τ_c :** In the event of a default, this is the time period between the default evaluation and the liquidation of collateral.

15. **Collateralization Period:** The time horizon of the margining process. This is typically the lifetime of the underlying netting set.
16. **Rounding Amount, RA:** This is the smallest collateral unit allowed for posting. Collateral posted is denominated in units of the rounding amount such that the total collateral posted is a multiple of the rounding amount.

6 Optional and Mandatory Break-Clauses

Long dated trades often include a break-clause. This is a trade feature introduced to reduce funding and credit charges. It provides counterparties with a choice to terminate or unwind a transaction early before maturity on pre-specified dates in the future at prevailing market rates. It provides the opportunity to terminate trades at zero cost which is desirable for transactions with significant exposure to counterparties in distress, which may default.

Counterparty credit valuation adjustments often referred to as XVA charges are typically not charged beyond a break clause. Meaning a 20 year deal say with a break clause in 10 years would only be credit charged out to 10 years. Should either counterparty which to exercise the break clause they may do so, however non-exercised break-clauses would typically result in an additional credit charge for the remaining life of the transaction being applied to cover the residual credit risks and funding charges. Break-clauses can be either optional or mandatory.

7 Physical & Cash Settled Derivatives

Finally we highlight that some derivative contracts within client portfolios and netting sets mature and expire into another instrument, which requires special attention and consideration. For example a swaption is an option or derivative that expires into a swap if exercised. If a swaption is 'In-the-Money' or ITM the option is exercised and either (i) in the case of Physical settlement the underlying swap can be purchased at a discount or (ii) in the case of cash settlement the cash price difference between the underlying swap and the contract strike received.

In the case of physical settlement the transaction results in new transaction with associated counterparty credit risk, however in the case of cash settled derivatives the ITM cash benefit is received immediately and there is no further exposure to credit default risk. Collateralization must adequately accommodate both physical and cash settled transactions.

8 Conclusion

In conclusion we have discussed the two main types of financial transaction namely cleared and bilateral non-cleared trade types. We discussed the purpose and role of central clearing counterparties CCPs and how they aim to reduce credit risk through transaction netting and margining. We also discussed credit risk management, CVA charging on a portfolio netting set level

and gave a brief outline of the respective CDS pricing calculation. Furthermore we reviewed the collateral transfer process required for bilateral trading and gave a detailed overview of the legal documentation governing the process namely the ISDA Credit Support Annex or CSA agreement. Finally we considered special trade features namely break-clauses, physical and cash settlement features.

References

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