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Risk management, risk-based pricing and operational solutions

WHITE PAPER

WHY COLLATERAL & CCPs CAN BE BAD FOR YOUR WEALTH

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1. Introduction

In order to reduce counterparty exposures in the OTC markets, a rich variety of techniques have been developed over the years. These include netting agreements, collateral agreements, termination options and bought credit protection in the form of credit default swaps or insurance. The latest one is the use of Central Counterparties (CCPs). Although not new in principle, they recently received a lot of attention as a result of changes in regulation.

Most of these techniques perform as intended most of the time, but there are cases when exposure can be increased instead of reduced as result of them. This paper intends to explain when this is likely to happen, specifically in the case of collateral agreements and CCPs.

2. Agreements where the counterparty holds the collateral

Most collateral agreements in the OTC world have the legal structure of a Credit Support Annex (CSA) to an ISDA agreement. These agreements specify in detail the terms and conditions of collateral calls being made as a function of changing exposure. Depending on how the agreement is set up any collateral posted may be held by the counterparty or it may be held in escrow by a third party custodian. In the majority of cases the collateral is held by the counterparty and that is what we will concentrate on in section 2 to 5.

Interbank collateral agreements are typically bilateral, which means that the counterparty will be posting collateral to us if we have exposure on them, and we will have to post collateral to the counterparty if they have exposure on us. In either of these cases the collateral posted is unlikely to match the exposure precisely at any point in time. This is predominantly because it takes time to post and receive the collateral, and the exposure by its very nature keeps changing all the time. In the case where our exposure on the counterparty is (slightly) higher than the collateral we received, we will have some uncollateralised exposure, but this is obviously still better than not holding any collateral at all.

Some agreements specify thresholds which need to be reached before any collateral is posted or a minimum transfer amount (MTA), which conspire to make the collateral value different to the underlying exposure. The latest initiative from ISDA to standardise CSAs is proposing to eliminate the thresholds and the MTA by effectively setting them to zero and to allow only cash as collateral (as opposed to bonds or any other securities). This will help to make collateral match the exposure more closely, but the effect of the time lags still remains.

Let us consider for a moment what happens when we had to post collateral, and the exposure from the counterparty on us is now lower than the collateral posted. If the counterparty defaults now, we should get all the collateral back. If they refuse to return the collateral, we would not have pay out under the transactions outstanding. But in the latter case we lost all the collateral, and it was actually higher than the money we still owed them.

The exact legal situation is a subject of some debate. Whilst most sources agree that it should be possible to retrieve the collateral from a defaulting counterparty, there is significant legal risk. At least one source argues that collateral agreements under New York law offer better safeguards in this regard than agreements under English law, with neither one being completely riskless^[1]. The conservative approach is hence to consider any 'overcollateralisation' (the collateral exceeding the exposure) as a risk in its own right.

This may appear counter-intuitive: there is now an additional risk, which would not have existed if the collateral agreement had never been there. But the collateral agreement is clearly there to reduce risk. Overall, the main impact of collateral agreements is still to significantly reduce risk, of course. But there are specific situations in which the opposite happens, and it is hence worth having a closer look at when such situations arise.

3. Payments and transaction termination

Overcollateralisation arises whenever more collateral was posted than the exposure the counterparty has on us. One example where this happens is where the counterparty's exposure on us rises gradually over time, only to drop later on, all due to changes in the underlying prices and rates. In that case we will have to post more collateral as the exposure rises, and we will be making calls to receive some of it back as soon as the exposure drops again. What matters now is the call frequency and how fast the counterparty is in returning the collateral. Even when margin calls are made daily it could take some time for the counterparty to honour the collateral call, and it is now a regulatory requirement that these time lags should be modelled as at least 20 business days (so 30 calendar days) for large netting sets or those with illiquid transactions or collateral^[2]. For a further analysis of the effect of these time lags, please refer to^[3].

However, there is one clear case where the overcollateralisation occurs far more often: when a (large) payment is made to the counterparty under the terms of a derivative, we typically need to commit to the payment before the collateral is received back. Any substantial payment under a contract covered by the collateral agreement will of course lead to a drop in exposure, which will hence give rise to us sending out a margin call to receive some collateral back, and hence the time lags come to haunt us once again. For most institutions, these outgoing payments are the main source of overcollateralisation.

A typical example would be a (large) FX forward, which is out-of-the-money from our perspective, so when we settle at maturity we need to pay a lot more than what we receive. But any substantial payment gives rise to this effect.

Below is a simple example of a counterparty with an FX forward as the only outstanding transaction. Just look at the blue dotted line for the time being and ignore the green boxes. The FX forward is covered by a collateral agreement, and due to time lags there is still some exposure during the life of the transaction, with a huge spike at the end. The final payment is followed by a period of overcollateralisation, which does not last very long, but is quite pronounced. The exact size of the spike obviously depends on the specifics of the transaction, notably on the probability of it finishing out-of-the-money, and just how deep out-of-the-money it can get.

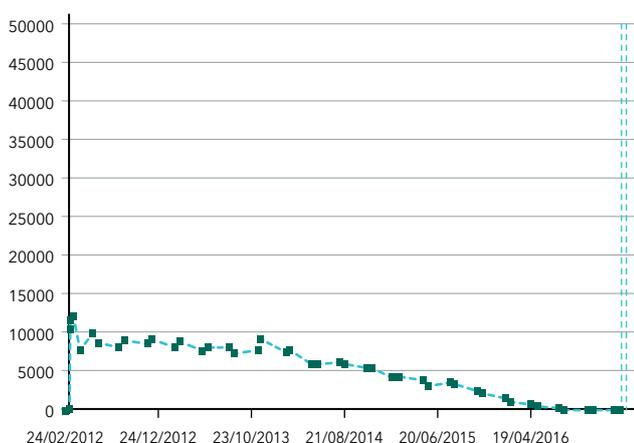


Figure 1: FX Forward Exposure

The next example shows an interest rate swap (IRS). IRSs have a series of payments, instead of just a single one at the end. Again, it is the probability of us having to make those payments and the size of them that will matter here. Every time a payment is made it takes (a short) time to get the collateral back, and that produces the spikes in the exposure profile.

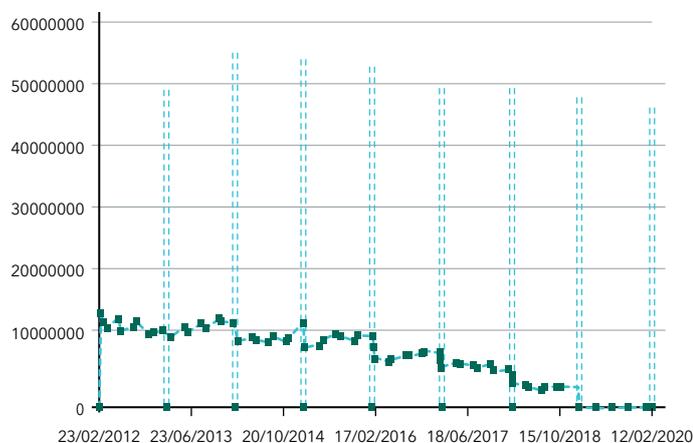


Figure 2: IRS Exposure

4. Interpretation of the profile

Understanding why these spikes in the exposure profile occur is one issue. Deciding what to do with them is quite another. It is quite important to realise that these spikes are not some artificial effect of the exposure calculation: these exposures are very real, and the temporary overcollateralisation after a large payment is clearly visible in the back testing of credit exposures.

Some institutions have argued that the payment should be withheld until the collateral is received back. If such a policy is implemented, it will make the spikes disappear. The exposure in the two figures in section 3 will look like the green line and not like the blue dotted line. But in most cases this will lead to legal problems: the payment under the OTC contract is typically due before a collateral call can be made, precisely because it is the payment which suddenly reduces the exposure. Having a settlement netting agreement in place does not change this, as these agreements typically only net between payments made under OTC contracts and do not include any settlement of collateral. Even if it would be possible to deal with the legal issues, it would require careful monitoring of the payments made and collateral received. In most institutions the settlement systems for OTC contracts are distinct from the systems managing collateral calls and transfers, and understanding at any one point in time which payment should be withheld before which collateral is received is not straightforward to implement from an operational point of view.

Another way of dealing with the exposure spikes is to ask oneself whether these should be included in the Pre Settlement Risk (PSR) profile. For overcollateralisation caused by changes in underlying rates and prices (see section 2) this is the natural place, but the spikes caused by outgoing payments look very much like settlement risk. This is indeed how some institutions (want to) manage this: they can be taken out of the PSR exposure profile, so that it looks 'smoother', and managed together with settlement risk under a different risk type. This doesn't, of course, make these peaks go away, but it does mean they get managed under a different limit.

5. Phantom collateral

Apart from all the effects of overcollateralisation described above, there is an additional phenomenon: some collateral agreements specify a Minimum Transfer Amount (MTA). If the difference between the exposure and the collateral held is lower than this amount, no collateral call is generated. This is done to reduce the processing cost associated with collateral calls.

When exposure is simulated, then it may well be the case that under some scenarios there is still some collateral posted with the counterparty when all transactions matured off. If that collateral is below the MTA, then the simulation will never trigger another margin call to clean it up. This hence leads to a simulated exposure without an end date. This exposure would be quite small, as it is below the MTA, but exposures without end dates still have a habit of creating problems. One of them is that if the exposure profile gets compared to a limit, the limit will usually have an end date, and hence an excess will be created.

Contrary to the other effects caused by overcollateralisation, which represent real exposures and hence real risk, this one is just an artifact of the simulation, and is caused by the fact that a simulation takes into account the currently outstanding transactions and not future trading. The small exposure lasting until infinity does not represent any real risk: when future trades happen, collateral will keep moving, and future collateral calls will be made. In the unlikely event that there are no further trades with this counterparty, the collateral agreement will be terminated and cleaned up at some point.

It is hence safe to assume that this exposure can be eliminated, and all that needs to happen is that the simulation engine needs to clean up the collateral after the last transaction matured off.

6. Collateral held in escrow

All the above refers to the situation where the collateral is held by the counterparty. Let us consider for a moment what happens when the collateral is held in escrow by a third party.

The mitigating effect of the collateral on our risk against the direct counterparty should be unchanged. If the counterparty defaults at any point in time, then only the (hopefully small) part of the exposure not covered by collateral leads to a loss.

The risk generated by the collateral itself is drastically different this time: there is no longer an overcollateralisation effect, but instead all the collateral is at risk. That risk depends this time on the creditworthiness of the third party. Typically, custodians for holding collateral have a much better credit standing than ordinary counterparties. Even more importantly: if their credit standing should start to deteriorate, it is usually possible to change the custodian, as there is no economic disadvantage to the counterparty for doing so. This is very different from the transactions concluded directly with the counterparty.

These cannot be changed or closed out unless there is a specific termination clause in place.

So even though the total exposure may be higher when collateral is held in escrow, the total risk may very well be lower. It depends on the creditworthiness of the custodian. It is important to realise this situation is not riskless either, but at least the calculation in this case is easier as there is no overcollateralisation effect.

7. CCPs

Since the 2007 financial crisis, there are regulatory proposals in both the United States and the European Union to promote the use of Central Counterparties (CCPs), in order to reduce or even eliminate counterparty credit risk^[4]. The CCP is intended to function as a clearing house and take over the legal obligations of the counterparties in bilateral contracts. Clearing houses are typically highly capitalised and require all the participating counterparties (the clearing members) to post collateral. The collateral agreement is usually asymmetric and requires the posting of initial margin. This forces the clearing member to be overcollateralised all the time.

One of the obvious issues of concern is the extra collateral requirement, because posting collateral comes at an economic cost. A study by the TABB Group estimates the extra collateral required to be about USD 2 Trillion^[5]. But that is not the only issue.

A central question to deciding whether CCPs are beneficial is whether they increase netting efficiency. A typical financial institution will have a large number of trades outstanding with any of its main counterparties, and it is the large number of diversified trades which causes the netting effect to be significant, as at any point in time some will be in-the-money and some will be out-of-the-money. If there were a single CCP across all asset classes and geographies, then the netting efficiency would increase. If, however, as is more often the case, CCPs are set up by asset class or by geography, the netting efficiency might be reduced, compared to the current situation. A paper by Duffie and Zhang^[6] proves that when there is a benefit of introducing a CCP for a particular asset class, it will never be efficient to introduce more than one CCP. It then goes on to show that for plausible cases the introduction of a CCP for one class of derivatives (e.g. credit default swaps) will lead to reduced netting efficiency and increased collateral demands.

At the moment clearing houses compete for business, which causes some of them to be successful in particular geographical markets or asset classes. Clearing houses will typically only deal with certain types of standardised transactions, and in principle they could function across national boundaries, but bankruptcy legislation may well stop them from accessing collateral held in one country to cover losses in another^[7].

Precisely because CCPs may become more important there are increased tensions between countries about where they are located and which geographical markets they serve. In 2011 the European Central Bank stated that London-based LCH.Clearnet was unfit to handle claims denominated in Euro because such a clearing house should be located in the eurozone, which prompted the UK to start legal action against the European Central Bank at the European Court of Justice ^[8]. These pressures increase the likelihood of the CCP landscape being highly fragmented, using increased liquidity from the market.

But whatever the systemic consequences and efficiency of clearing houses may be, it is important to realise that they are not risk-free. Since 1970, three clearing houses actually defaulted, and another three narrowly escaped default ^[9].

The clearing house defaults were:

- › Caisse de Liquidation des Affaires en Marchandises, France, 1974
- › Kuala Lumpur Commodity Clearing House, Malaysia, 1983
- › Hong Kong Futures Exchange, Hong Kong, 1987

The ones narrowly avoided:

- › CME, United States, 1987
- › OCC, United States, 1987
- › BM&F, Brazil, 1999

In their quest to compete, clearing houses are under pressure to lower their margin requirements, which would defeat the purpose of having the CCPs in the first place. Especially in the United States, where trading in OTC derivatives is concentrated around a dozen or so major dealers, there is a potential conflict of interest. The Office of the Comptroller of the Currency (OCC) estimated that, as of the third quarter of 2010, five large commercial banks in the United States represented 81% of the industry's net credit exposure to derivatives, causing concern about the large swap dealers dominating the clearing house ^[10]. If the clearing houses do absorb most of the risk currently held bilaterally, they might become the ultimate 'too big to fail' entities, like the monoline credit insurers which during the financial crisis absorbed too much credit risk and had to be bailed out.

As a consequence, the best way to deal with a claim on a CCP is to look at it in the same way as the risk against any other counterparty, but to take into account the fact that the institution would never receive any collateral from them, so that the exposure is equal to the gross risk, and to model any overcollateralisation as an additional risk, along the lines of what was described in sections 2 and 3 above.

8. Conclusion

For all the unexpected effects there might be to a CSA, their overall mitigating effect is uncontested. CSAs should hence be implemented wherever feasible. Depending on the circumstances, they may cause the institution to be overcollateralised at specific points in time. This is not merely a theoretical issue, it is a genuine risk, so as with any other risk it is important to model and analyse this correctly. Phantom collateral as described in section 5 is just a by-product of the simulation, which should not appear in any risk profile.

CCPs may help in risk mitigation, as long as they have a default probability which is significantly below that of a typical counterparty, do not cause significant additional overcollateralisation and cover a sufficiently large part of the market in order not to reduce the overall netting effect. Whether they do so or not, if they are being used the risk exposure profile against them should be calculated and monitored, as they are not entirely risk free, and will cause a higher exposure than a typical counterparty because they require significantly more collateral.

9. Bibliography

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