WHITEPAPER:
COLLATERAL OPTIMISATION
IN A CENTRALLY CLEARED WORLD

4SIGHT
FINANCIAL SOFTWARE

Introduction

Collateral management has been used for hundreds of years as a powerful tool for managing risk. This is its primary and most important purpose. However, following the upheaval of the financial crisis and the default of a large, interconnected broker when Lehman Brothers collapsed, there has been a seismic shift in the evolution of the collateral management process.

Post-crisis, we have seen advances in collateral management follow two distinct but interconnected routes:

Route 1 – More effective risk management

The first path centres around more effective risk management. Firms are starting to use far more sophisticated methods to monitor and control counterparty credit risk. This includes giving more thought to the likelihood a counterparty will default. It also involves a greater consideration of how easy it is to liquidate collateral in the event of a default.

Firms are now applying increasingly complex collateral eligibility, concentration and haircut rules to mitigate these risks and implementing technology systems to support this.

Route 2 – Cost reduction

The second evolutionary branch in the collateral management story is around **collateral optimisation**. This has seen collateral management diverge into a cost reduction exercise. Due to a squeeze on high quality collateral, firms are now seeking to manage the flow of collateral and its balance sheet utilisation in a more efficient way.

It is collateral optimisation that this paper will focus on. It will discuss what optimisation actually is, what is driving it, techniques to optimise collateral and how these techniques are helping firms adapt to a centrally cleared world.

What is Collateral Optimisation?

Some differing definitions of collateral optimisation include:

"Giving each counterparty the cheapest to deliver collateral that meets their acceptability guide-lines."

"Making the best use of inventory across the entire firm to satisfy all collateral requirements."

"Managing collateral supply and demand on an enterprise-wide basis in the most efficient manner possible."

At 4sight, we see collateral optimisation as centralising collateral management and optimisation into a profit centre, or 'collateral hub'.

This allows firms to keep a tight control of exposure and collateral usage costs on an enterprise-wide basis across all business lines. From there, firms can make best use of collateral inventory across a number of different trading opportunities to reduce costs and generate a greater return on economic capital.
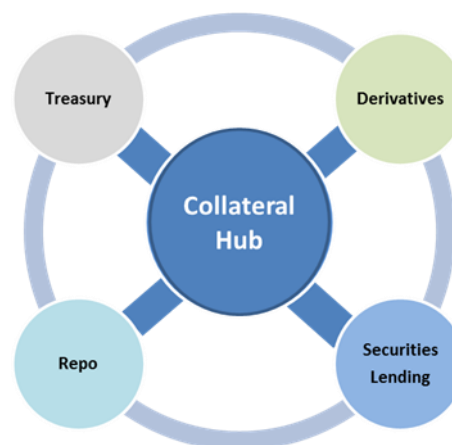
Optimisation is unique to each firm

While these definitions shed some light on the optimisation process, the exact nature of optimisation depends on the unique strategy and business model of each firm. Goals of optimisation vary for each company, as do the cost savings that are possible. This is largely dependent on factors such as:

- The size of the business
- Products traded
- Geographical footprint
- Volumes processed
- Risk profile
- Growth strategy
- Sophistication in counterparty credit risk
- Ability to centralise product silos (securities lending, repo, derivatives etc)

Because of these factors, technology projects for optimisation typically involve a high level of process mapping and development of custom algorithms for each firm. There is no 'one size fits all' approach to optimisation. Technology vendors must be flexible in accommodating client needs rather than offering a generic off-the-shelf solution.

Collateral allocation still involves a human decision based on common sense

While technology solutions can perform complex calculations and automate many manual processes, collateral allocation still involves subjective decisions. There are many factors affecting the optimum use of collateral. There are also competing demands for collateral between desks (Derivatives, Securities Lending, Repo, Treasury etc) with widely varying strategies and objectives.

To solve this, it can be beneficial to assign a designated department or individual with responsibility for overseeing the entire collateral function across the firm and making decisions on how scarce resources are allocated.

This means allocation can be more objective, based on the most profitable economic return and the opportunity costs of a given deployment of assets, rather than political conflicts between different business units and strategies.

What is Driving Collateral Optimisation?

Both supply and demand side factors are interacting to create a liquidity squeeze as collateral supply dwindles while demand for high quality collateral simultaneously increases. There are wildly varying estimates of the exact size of the liquidity shortage that will result from this.

Some calculations predict that a severe shortage of highly rated assets is on the horizon, while others suggest the impact on global liquidity may not be quite so dramatic. However it is clear that collateral will become more expensive to some extent and collateral optimisation is therefore an important strategy that can help firms adapt to the new environment.

Supply side factors

The poor fiscal position of many governments, particularly in the Eurozone is leading to rating downgrades for many sovereign bonds. Before the crisis, government debt of these countries was AAA rated, resulting in a large supply of high quality collateral. Until recently, collateral was therefore relatively inexpensive and easy for trading desks to obtain.

However, the International Monetary Fund recently predicted that sovereign downgrades will reduce the supply of general collateral by approximately $9 trillion by 2016. This is a significant shortfall. When combined with a sharp increase in demand for collateral it could lead to a considerable shortage of quality assets.

Demand side factors

There are a number of factors affecting demand for collateral including:

- Initial and variation margin required by CCPs for derivatives trades

- Contributions to CCP default funds

- Reduced netting capabilities from CCP product fragmentation compared with bilateral netting opportunities

- Basel III capital requirements requiring banks to hold more liquid assets

- More segregation of assets required by EMIR, Dodd Frank, Basel Committee/IOSCO etc

- Less rehypothecation

- Drying up of unsecured funding, leading to more collateralised trades

- More stringent regulations around collateral for bilateral trades

Who Can Benefit from Collateral Optimisation?

Sell side

Firms processing high volumes of trades and collateral movements clearly stand to benefit most from optimisation. The combined effects of a large number of even small incremental reductions in the cost of collateral for each trade can result in a significant boost to the bottom line.

Large sell side firms processing many trades across multiple products can therefore gain the greatest ROI on collateral optimisation. However, it is still possible for smaller institutions to achieve measurable cost savings from optimisation.

Buy side

In the past, many buy side firms required very little focus on collateral management and put minimal investment into technology systems and processes. However, out of necessity, market and regulatory change is forcing the buy side to invest in collateral management and optimisation.

Central clearing for OTC derivatives trades will compel buy side firms to pledge more cash and highly rated sovereign bonds to meet margin requirements for their derivatives trades. This is not particularly palatable for the buy side as it causes problems for their asset allocation preferences and creates a drag on returns.

Collateral transformation services are therefore being offered to the buy side to upgrade lower quality assets into CCP eligible collateral for a fee. However, depending on the economics of upgrade trades this may be an expensive option for many on the buy side.

Buy side firms are therefore coming to the realisation that collateral optimisation is an important part of the toolkit for reducing the pain of collateral shortages. This can range from pledging the cheapest to deliver collateral for each trade to more sophisticated allocation decisions on which trades are least expensive based on the collateral cost, netting capabilities, eligibility criteria of a given counterparty, etc. The cost savings that can be achieved from optimisation may easily outweigh the investment in technology and resources required to streamline collateral usage for many buy side firms.
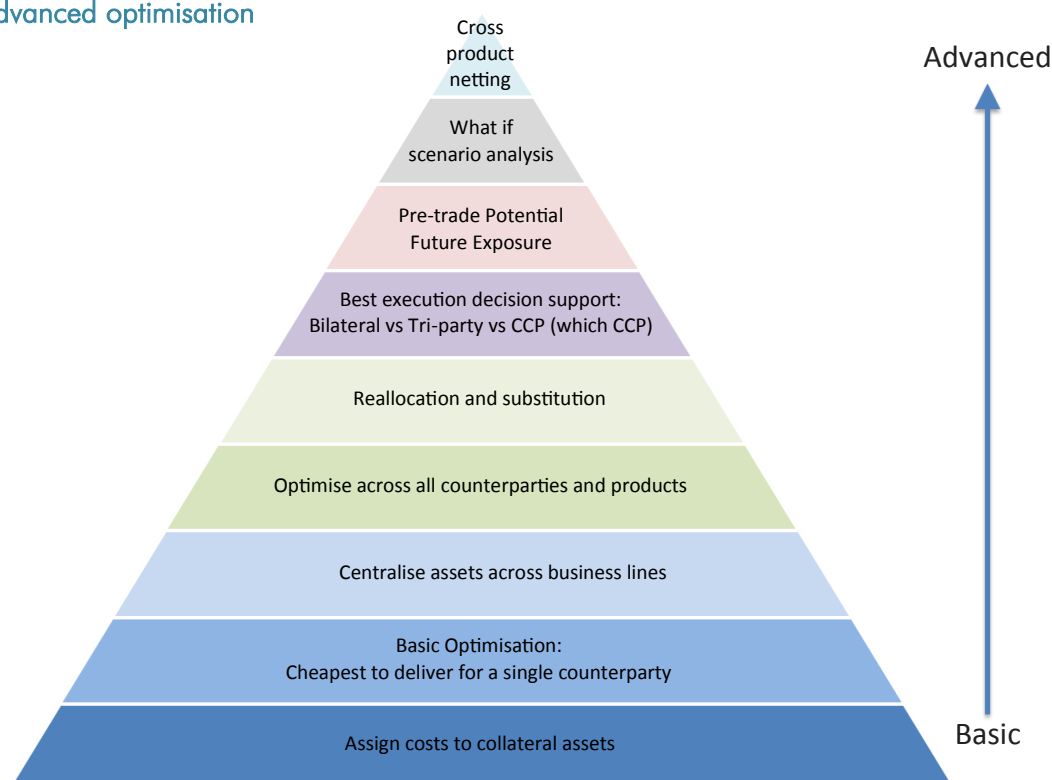
What Techniques can be used to Optimise Collateral?

Collateral optimisation is still in its infancy and there are varying degrees of sophistication to the optimisation process. Some optimisation techniques are also still taking shape due to a lack of clarity around new regulations. It is therefore doubtful if even the most forward-thinking firms are currently applying all of the more advanced optimisation methods. However, it is useful to imagine a possible future model of collateral optimisation that almost perfectly balances the supply and demand for collateral with sound risk management and minimal impact on balance sheet.

The diagram below shows a range of optimisation techniques. It moves through the basic building blocks of simple optimisation, to more advanced optimisation requiring complex algorithms and more sophisticated processing.

Basic and advanced optimisation techniques

Cross product netting

What if scenario analysis

Pre-trade Potential Future Exposure

Best execution decision support: Bilateral vs Tri-party vs CCP (which CCP)

Reallocation and substitution

Optimise across all counterparties and products

Centralise assets across business lines

Basic Optimisation: Cheapest to deliver for a single counterparty

Assign costs to collateral assets

Advanced

Basic

As already discussed, there is no one size fits all approach to optimisation. Firms can simply select individual elements that meet their specific needs as they move up the value chain.

There is also no prescribed order in which one needs to implement the steps illustrated above. However, some elements must naturally precede others before it is possible to reach the next stage.

Building Blocks of Optimisation

Before collateral optimisation can occur, a number of important first steps must take place to build the basic framework required:

Assigning costs to collateral assets

The first step is to assign a cost to all assets used as collateral. This involves assigning a funding spread where appropriate, using standard market overnight or term reference rates, such as Sonia/Eonia, Fed Funds, Libor etc.

Alternatively, you can create and assign bespoke internal benchmark rates. You can then use these rates to calculate and attribute collateral costs across all traded asset classes.

This allows you to allocate collateral costs at underlying trade, strategy and trading desk level and reward internal providers of collateral, whether trading inventory, hedge assets or inbound collateral received that is re-hypothecated.

Mapping eligibility criteria

To pledge the optimum assets that meet acceptability guidelines, it is essential to map your counterparties' collateral eligibility, concentration and haircut criteria. It is possible to achieve this by electronic download and mapping of each prevailing legal contract via an inbound feed (or manual input/updating of records if required). This allows you to update each client/counterparty profile for core eligibility criteria as required.

Basic Optimisation

Basic optimisation – post 'cheapest to deliver' for a single counterparty

Once collateral has been assigned a cost and acceptability rulesets established, you can then carry out basic optimisation. This means giving out the cheapest to deliver collateral that each individual counterparty will accept. Although it can generate cost savings, this model does not make use of the entire pool of assets available as collateral across the firm in a consolidated way.

Enterprise-Wide Optimisation

Centralising collateral across business lines

The next stage in achieving optimisation is to centralise collateral assets across all business lines your firm is engaged in to form the collateral 'hub'.

Inventory feeds from a multitude of sources are loaded into the collateral management system and organised into a company and book hierarchy structure. This allows you to view exposures at any level, for example at custodian, sub custodian, account level, or even the dividend entitlement level.

Furthermore, centralisation gives risk managers a far more holistic view of exposures and risk across the firm. It is possible to see the firm's real time total exposure figure across all products and counterparties in one system.

You can also view exposure with each individual counterparty across all traded products (securities loans, repo, derivatives etc), making it easier to comply with single counterparty exposure limits proposed in new regulations such as Dodd Frank. Finally, centralisation provides the foundation for netting exposures across different product lines.

Cross product optimisation

Centralisation enables the formation of a single collateral pool across all asset classes. When looking at their inventory, traders can see all available assets at every level of the firm, in real time. This provides the information needed to make optimal use of available inventory for collateral financing.

It also allows better utilisation of internal assets. Before going to the street to find expensive collateral to meet a margin call, you can see all available long inventory held by your firm. You can also make decisions on whether a security is best deployed in say, a securities loan or as collateral on a derivative trade, based on its collateral cost and the respective P&L it can generate.

More Complex Optimisation Techniques

Optimise allocations to all counterparties across the entire collateral portfolio

Centralisation of the collateral function paves the way for full optimisation across all counterparties for the entire collateral portfolio. This means the collateral management system can analyse the portfolio holistically across all asset classes and then propose the cheapest to deliver for all counterparties.

Reallocation and substitution

Once the optimum collateral is pledged across all counterparties and clients, the next stage of the optimisation process involves regular checks of the portfolio. The collateral system can then reallocate collateral on a daily (or intraday) basis in response to market changes.

Upon performing the reallocation sweep, the collateral system will then automatically carry out substitutions to bring the portfolio back into line with the most optimum allocations.

This is a balancing act between achieving the lowest cost of collateral and reducing the number of movements required. Most counterparties will not be happy if you are constantly substituting assets and settlement costs must also be taken into account. Optimisation is therefore about achieving the best *practical* allocation rather than the best *possible*.

Best execution decision support

Collateral management systems can help traders to make best execution decisions based on the economics of a given trade. This includes data on the least expensive settlement location to route a trade, for example a bilateral trade vs tri-party vs trading via CCP. It can also help decide which CCP/Clearing Broker to trade with for a given transaction.

These can be complex calculations that must take into account each CCP's collateral acceptability and margining methodologies, along with portfolio netting and offsetting capabilities. It must also incorporate the regulatory risk weighting of executing a trade bilaterally vs a CCP. At the time of writing, exact technical standards for bilateral margining have not yet been finalised by regulators. This means that a full comparison of bilateral trading vs central clearing under the new regulatory regime is not yet possible.

Potential future exposure calculations

Finally, collateral management systems will allow users to forecast exposure scenarios and resulting margin requirements through the lifespan of a given trade more accurately. This involves calculating Potential Future Exposure figures by running Monte Carlo simulations to gain a snapshot of the possible margin requirements through the life of a trade. Traders can then price this into the funding cost of collateral and predicted P&L pre-trade. This allows more informed decisions on which trades will be most profitable.

What if scenario analysis

While not strictly related to optimising the collateral portfolio from a cost point of view, scenario analysis can be useful for optimising from a risk perspective. This allows the collateral management system to generate real time 'what if' scenarios and stress test the entire collateral pool as market conditions change.

You can see the effects of movements in market prices, exchange rates, ratings etc and then analyse the impact this has on the collateral held and available. It also allows you to 'shock' the collateral portfolio by modelling the effects of 'black swan' events on the balance sheet.

Cross product netting

While technology systems currently support netting of exposures across products, full cross product netting is not yet prevalent in the market. Non-standardisation of legal agreements for derivatives and securities lending/repo is therefore holding back some of the potential netting benefits across products.

What are the Benefits of Optimisation?

Collateral optimisation offers significant benefits for financial firms of all sizes seeking to respond more smoothly to a world of collateral shortages. It is true that optimisation requires up-front costs to modify procedures, centralise inventory across desks and invest in technology. However, the cost savings of successful optimisation can generate a measurable return on investment. With new regulations looming and collateral in increasingly short supply, optimisation is rapidly becoming a necessity.

Key benefits:

- Manage collateral supply and demand more efficiently
- Highlight collateral shortfalls
- Avoid over-collateralisation
- Easily identify surplus collateral sitting idle
- Free up valuable liquidity
- Accept a wider range of collateral
- Gain clear figures for both actual and your optimal collateral costs
- See discrepancies between the collateral you receive and what you can pledge
- Forecast collateral requirements more accurately
- Comply with regulatory requirements and reporting more easily
- Make best execution decisions on cost of bilateral vs Tri-party vs CCP vs which CCP
- Enhance customer service and offer more competitive customer pricing

Build or Buy - Reasons to use a Vendor Solution for Optimisation

Many financial firms are using legacy solutions for managing collateral, ranging from simple spreadsheets to more complex systems developed in house. However, there are a number of reasons why using a vendor solution for collateral management and optimisation can be more effective.

The vast scope of regulatory change currently facing the industry makes it hard to build and maintain in-house systems that are fit for purpose. Monitoring new rules and rapidly building technology support requires greater resources and increased headcount.

Furthermore, the collateral technology arms race is now moving too fast to keep up without deploying significant investment in software solutions to maintain competitive advantage. Using a vendor solution ensures that firms can benefit from the most advanced optimisation tools available on the market.

Vendor systems can also include enhancements and new algorithms requested by other customers of the technology provider. This shared approach keeps development costs to a minimum compared with building new algorithms in-house.

There are also significant benefits to replacing multiple legacy systems with a single unified solution that supports securities lending, repo and derivatives collateral management in one place. It allows more standardization of processes across products, can reduce software maintenance fees and offers the advantage of dealing with one vendor for product support.

It is therefore important to ensure the technology vendor selected can offer a solution with the necessary depth of securities lending, repo and derivatives functionality. Systems with a strong trading and inventory management function across these products as well as margining capabilities are also essential.

About 4sight Financial Software

4sight Financial Software is an independent software solutions provider with sixteen years of experience and offices and clients worldwide. 4sight's customer base includes a full spectrum of buy and sell side market participants from smaller banks and asset managers through to global broker dealers.

Clients in sixteen countries on four continents use 4sight's software to meet their business needs and 4sight offers the reliability and experience of a company with a proven track-record.

The 4sight Xpose Collateral Management system provides an enterprise-wide, cross-product collateral management solution for securities lending, repo, and OTC/exchange-traded derivatives collateral. 4sight's product range also includes solutions for securities finance, settlement and market connectivity.

In addition to software development, 4sight provides project management, consultancy services and customer support through its global network of offices.

4sight was recently voted winner of the Collateral Management System category by its customers in the 2012 Global Investor/ISF Magazine Equity Lending Awards.

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For further details, please visit: www.4sight.com

About the Author

Martin Seagroatt is Head of Global Marketing for 4sight Financial Software. He joined 4sight in 2005 after previously working as a business expert in technology systems for risk management in the energy industry.

In his 7 years at 4sight, he has specialised in Securities Lending, Repo and OTC/Listed Derivatives collateral management.

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