4SIGHT
FINANCIAL SOFTWARE

WHITEPAPER:
FUTURE TRENDS IN OPTIMIZATION
COLLATERAL, REGULATORY CAPITAL &
CCP SELECTION

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Introduction

Financial firms are currently experiencing significant regulatory and cost pressures. This is leading to a search for ways to optimize various aspects of trade types that involve some level of counterparty credit risk (derivatives, securities lending, repo).

This paper looks at the different types of optimization for these trades, how they are calculated, and how the different optimization groups are interrelated. It also discusses some of the practical aspects of this type of multivariate optimization.

A summary of the main trade optimization categories is below:

1. Regulatory Capital Optimization

Basel III rules require banks to hold more loss absorbing tier-one capital, reduce leverage and maintain liquidity coverage ratios. Bank CEO's and other senior executives are therefore looking at ways to optimise the use of capital and boost their firm's return on equity.

At a strategic level, this looks at which business lines are making the most P&L per unit of economic capital. As efficient use of capital improves profitability and return on equity, it then attracts more tier-one equity capital from investors. This is a key element in making banks an attractive investment compared with other industry sectors in an era when attracting capital is of critical importance but also more difficult.

2. Collateral Optimization

Dodd Frank and EMIR regulations are increasing collateral costs through demand for high quality liquid assets for central clearing of derivatives. This has led to widespread use of collateral optimization solutions.

These systems can help financial firms to reduce collateral costs by managing collateral supply and demand in an efficient way. Optimization also allows firms to make more effective use of eligible collateral assets sitting idle on the balance sheet.

3. Counterparty Optimization

The move to central clearing is leading firms to think about which is the optimum counterparty to execute a trade with. For example, is it cheaper to execute a given trade bilaterally or with a CCP? If it is via a CCP, then which CCP is cheapest? Likewise, if the trade is bilateral, then which bilateral counterparty offers the lowest trade cost?

4. Trade Type Optimization

Finally, there is trade type optimization. This looks at the difference in P&L that the firm can generate by deploying a security/cash in a securities loan, a repo, or using it to collateralise a derivatives trade. This process could also consider whether the firm should keep the security on its balance sheet to meet Basel III liquidity coverage ratios.

Factors to Consider

The diagram below shows the different optimization types and some of the main factors that technology systems should take into account to offer effective decision support.

Some of the optimization types share similar cost inputs. They are also closely related, for example, collateral optimization is a key component of both counterparty optimization and trade type optimization.

The outermost ring shows options for the decision that could be taken.

The second outermost ring shows the different factors that must be calculated to support the decision making process.

Different Optimization Types and their Components:
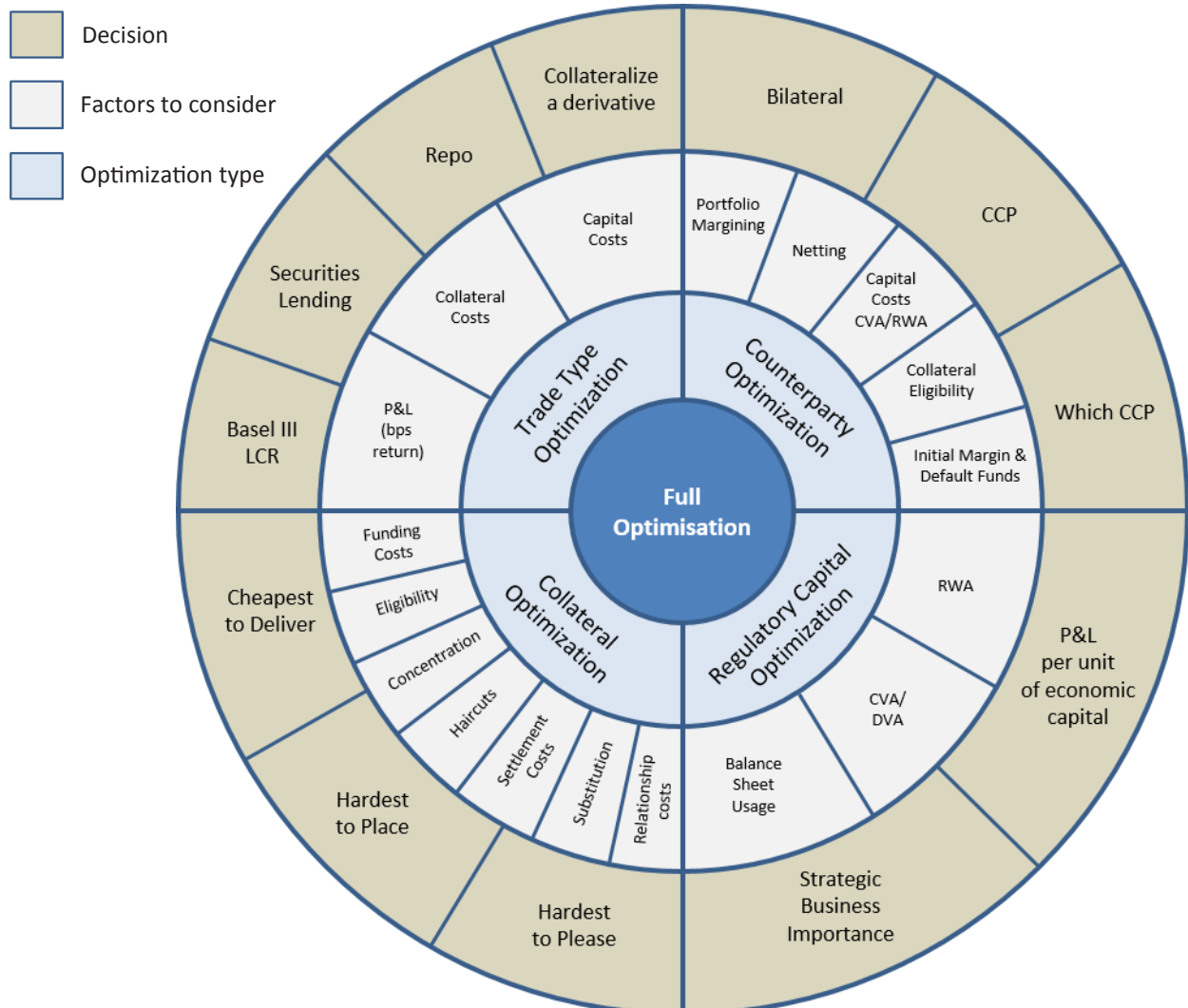
1. Regulatory Capital Optimization

Basel III requires banks and other financial institutions to hold more loss-absorbing tier-one capital in the form of shareholder equity and retained earnings. Basel III states that firms must apply a risk weighting to trading exposures (assets). The resulting Risk Weighted Asset (RWA) calculation is based on the likelihood of counterparty default.

Regulatory Capital Optimization Components
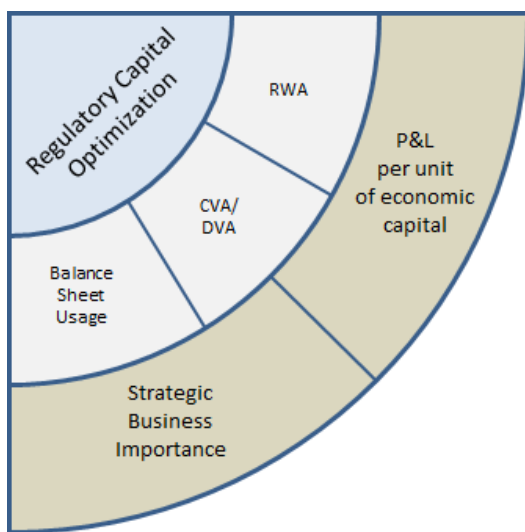
For derivatives trades, firms must calculate a Credit Value Adjustment (CVA) that factors in the counterparty default probability and the exposure at default. This involves complex Monte Carlo simulations of Potential Future Exposure (PFE) to estimate the exposure on the derivatives trade at given time-periods throughout the trade.

Conversely to CVA, there is also Debit Value Adjustment (DVA). This is a positive mark-to-market gain a firm can realise on a derivatives trade when the firm itself becomes more likely to default.

Optimization of capital therefore involves first calculating the cost of capital for a given counterparty/trading desk/business line. It is then possible to work out which counterparty/desks/business lines are generating the most P&L per unit of economic capital. This is a useful tool in guiding strategic decision making for the bank and rewarding efficient use of capital.

Optimum deployment of regulatory capital also involves subjective decisions. For example, a specific business line or geographical business unit may not be very profitable for the bank per unit of capital it consumes. However it could have the potential to generate large profits in the future and is therefore important. It could also be a loss leader for other related and profitable business with a specific client.

From an asset/liability management point of view, firms also have a finite balance sheet that is consumed when they trade. It is therefore important to optimise the use of balance sheet when trading to generate the most P&L per unit of balance sheet consumed.

2. Collateral Optimization

Collateral optimization involves centralising the collateral function and assigning a funding cost to collateral assets. The firm can then give out the cheapest to deliver collateral that matches its counterparties' eligibility criteria.

In addition to cheapest to deliver on a per counterparty basis, more advanced collateral optimization also involves collateral allocation decisions across the portfolio based on 'hardest (collateral) to place' and 'hardest (counterparty) to please'.

Collateral Optimization Components
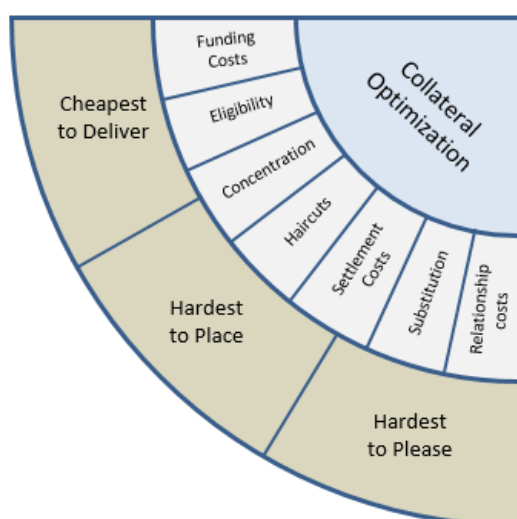
Hardest to Place

Hardest to place collateral assets are those that appear least often in your counterparties' eligibility schedules. For example, a given asset may not appear regularly in your eligibility schedules. However, you have some of it sitting idle in your inventory. It is not much use for Repo/ Securities Lending because there's not a great demand for it or it is illiquid.

This then means that it is 'Hard to Place' from a collateral usage point of view. By this rationale, if there is a counterparty schedule that will accept it, it makes sense to identify it and to pledge it out.

Hardest to Please

'Hardest to please' methodology is the process of allocating collateral efficiently across all of the firm's counterparties.

The firm's range of counterparties naturally accept different collateral types across the liquidity spectrum. Some may only take highly rated government bonds. Some may have eligibility criteria and concentration rules that accept less highly rates bonds, equities or mortgage-backed and asset backed securities.

It goes without saying that it is best to avoid giving out your AAA bonds to the counterparty that will accept the less liquid securities if you can avoid it. Collateral optimization solutions now allow users to match the hardest to deliver assets with 'easiest to please' counterparties and vice versa.

Dynamic Substitution and Reallocation

Finally, optimization solutions offer dynamic substitution and reallocation in line with 'cheapest to deliver' methodology. This allows collateral managers to perform automated substitution runs on a daily or intraday basis to re-optimise the collateral portfolio from a cost point of view.

Of course, this is limited by how many collateral substitutions it is realistic to make and must include settlement costs and subjective relationship costs with the counterparty.

Collateral Optimization Inputs

To optimise collateral efficiently, technology solutions need to factor in a wide variety of costs and criteria. This includes funding costs, optionality, eligibility and concentration rulesets, haircuts, substitutions and settlement costs. It could also include rehypothecation rights and their impact on collateral funding costs.

A centralised view of collateral inventory and exposures on a firm wide basis across business lines is another fundamental building block in making best use of collateral assets.

Finally, decisions about any wrong way risk involved in the collateral exchanged and its correlation with counterparty default could also be considered as this may attract a higher exposure weighting under Basel III.

For a more detailed discussion of collateral optimization techniques please see the 4sight whitepapers:

Collateral Optimization in a Centrally Cleared World

Collateral Optimization: Beyond Cheapest to Deliver and the Big Red Button

3. Trade Type Optimization

Trade type optimization offers decision support around how to make the best use of a security or cash a financial institution is holding on its balance sheet. It attempts to work out the opportunity cost of using an instrument for a given purpose vs other trade types.

For example, is it most profitable to deploy it in a securities loan, a repo, or to collateralise a derivatives trade? This process also needs to consider whether the firm should keep hold of the cash/security to meet Basel III liquidity coverage ratios.

### Trade Type Optimization Components
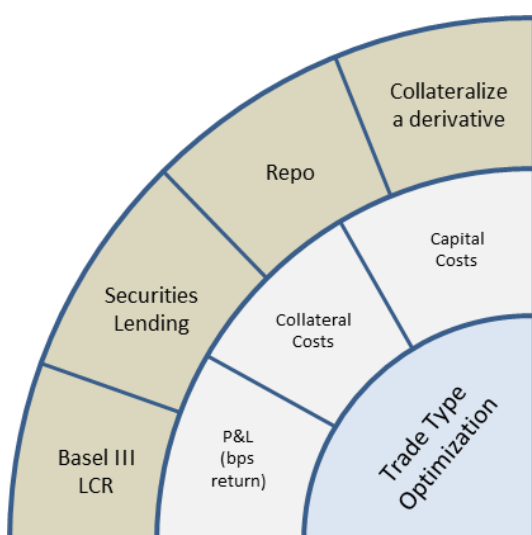
Trade type optimization should attempt to quantify the P&L that can be generated by a given trading strategy, for example the fee that can be earned on lending out a particular security. This can utilise various benchmarking services available on the market and take into account whether the stock is a 'special'.

Trade type optimization must factor in both the cost of regulatory capital the firm needs to hold against a trade, along with collateral costs. At the time of writing it is currently unclear whether a particular trade type may become more profitable than others as regulations affecting both securities finance and derivatives trading are still in flux.

4. Counterparty Optimization

Trading with a given bilateral counterpart or CCP has a cost. This cost is made up of many different components. For this reason, best execution decisions around who to trade with are potentially the most complex of the optimization techniques discussed in this paper.

Counterparty Optimization Components
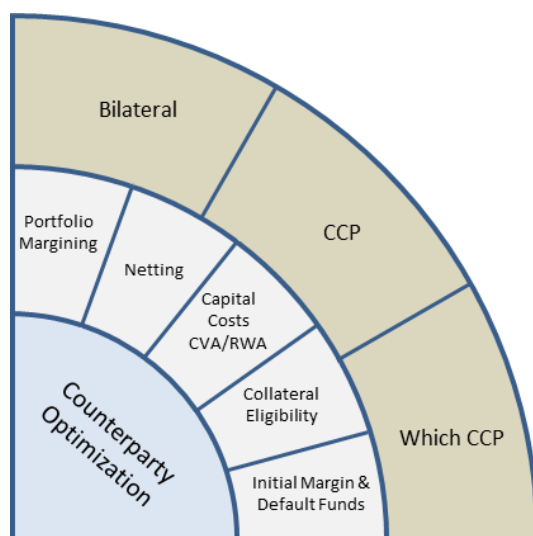
One factor is the initial margin requirements imposed by the CCP or bilateral counterpart. The counterparty's collateral eligibility, haircut and concentration schedules also need to be taken into account.

If one counterparty will take lower quality collateral against a trade then the collateral cost will be lower than trading with someone else. Furthermore, the netting and portfolio margining benefits in terms of the wider portfolio of trades with a particular CCP or counterpart also need to be included.

To add to the complexity, counterparties/CCPs have varying risk weightings under Basel III. Trading with a CCP has a lower risk weighting than trading with a bilateral counterparty for example. This results in a higher or lower cost of capital depending who a firm is trading with. Because of this, counterparty optimization needs to include RWA, Cost of Capital, CVA, and DVA calculations. The capital that must be held against CCP default contributions should also be factored in as this may be significant under Basel III.

The reader should be starting to get an idea of how difficult these types of trading decisions can become.

For example, a CCP trade will have low CVA and regulatory capital charges compared to a bilateral trade. However, it could have higher collateral funding costs than a bilateral trade due to the more liquid collateral required by a CCP and also any default fund contributions. This makes it hard to find a truly optimum solution across the entire portfolio.

Challenges in Multi-Factor Optimization

Evaluating all of the different criteria discussed above in a way that supports effective decision-making is extremely complex. For example, even multi-factor collateral optimization is very complicated due to the number of costs that must be considered.

To add in a further level of optimization around where to execute a trade, that also includes regulatory capital costs, adds another layer of complexity into the mix.

The more advanced optimization techniques typically require customization for each client. There are so many inputs to consider that it can also be hard to find a truly optimum allocation on a real time basis. There are limitations in data processing speeds and hardware costs. Optimization needs to occur in a timely manner to support pre-trade decision making.

The calculations discussed above also typically involve data from multiple technology systems, and different, often siloed business units. A clear view of optimum trading strategy therefore involves some form of central co-ordination. This process has begun to some extent through the consolidation of collateral usage across securities lending, repo and derivatives and we expect this to continue.

At 4sight, we believe that for every financial firm there is an optimum cost/ benefit trade-off between the effort required to implement a given level of optimization and the rewards that can be gained. This depends on the size of the firm, its trading strategies, sophistication and IT footprint. It is important for firms to consider this when working out how far they can go with optimization.

Conclusion

While there are practical limitations to the multi factor optimization discussed above, we believe that it can provide a useful tool for financial institutions to adapt to the new world of more expensive collateral, trading via CCPs and a finite supply of tier one capital.

We expect to see these optimization techniques becoming more widely used as forward thinking firms seek to maintain profitability, open up new revenue streams and generate shareholder value.

About 4sight Financial Software

4sight Financial Software is an independent software solutions provider with seventeen 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.

4sight Securities Finance is a real-time, front to back office system for all Securities Finance trade types. It helps smaller direct lenders through to global custodians, brokers or intermediaries to manage the Securities Finance process more easily. 4sight's Securities Finance system supports both agency and principal trading of equities and fixed income securities.

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

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

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 8 years at 4sight, he has specialised in securities lending, repo and OTC/listed derivatives collateral management.

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