



A balancing act

The collateral challenge for capital markets firms

CENTRE *for*
**REGULATORY
STRATEGY**
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Executive summary

Forthcoming regulatory requirements to hold and exchange collateral in derivatives markets will increase demand for eligible assets. At the same time they will impose further restrictions on the use and availability of the existing collateral inventory. Firms will face an unprecedented collateral challenge and will need to optimise their collateral management processes in order to increase efficiency in managing and sourcing collateral. This paper sets out emerging best practices for capital markets participants in managing their collateral, including principles of 'good' collateral management, and a number of advanced techniques to maximise collateral management efficiency and thus reduce costs.

A number of regulatory requirements, notably margin requirements for non-cleared derivatives and the prudential framework for liquidity, will place competing demands on high-quality assets, prompting firms to optimise their collateral management processes. Increased efficiency will result in cost savings. We found that a 1% increase in collateral efficiency could result in approximately \$1.2m additional revenue per billion units of collateral for an investment bank with a collateral surplus. For a retail bank with a collateral deficit, the same increase in efficiency could result in approximately \$1.09m in cost reductions for the same units of collateral.

We argue there is no single optimal target operating model for collateral management and individual firms need to decide whether to outsource or keep in-house the whole or part of their collateral management processes, depending on the size of their derivatives portfolio and business model. There is also an increasing industry trend for market participants to move parts of their internal collateral management function to market utilities which aim to centralise and standardise many of the common services (such as collateral valuation and negotiation) required for collateral management.

Principles of collateral management

The most fundamental principle of managing collateral is having transparency of collateral needs and inventory across the firm. One way to achieve this is to manage collateral centrally through a Central Collateral Management Function (CCMF) which generates a single view of all assets and liabilities and offers the ability to use and deploy inventory across business lines.

A number of regulatory requirements, notably margin requirements for non-cleared derivatives and the prudential framework for liquidity, will place competing demands on high-quality assets, prompting firms to optimise their collateral management processes.

The CCMF should be supported by appropriate systems and controls and have an integrated IT infrastructure to offer a real-time view of collateral. A clear collateral policy should also be in place to articulate the sourcing of collateral, the make-up of the collateral pool, the parameters of the segregation requirements, and the circumstances under which collateral can be re-used. Revisiting existing documentation regarding the exchange of initial margin (IM) and variation margin (VM), and putting in place transparent transfer pricing agreements should be additional considerations for firms as they implement the new requirements.

Advanced strategies

Maximum collateral efficiency can be achieved through the deployment of a number of advanced techniques. Some of these techniques such as matched book dealing¹ and internalisation of trading activities are aimed at utilising existing collateral more efficiently, while others such as portfolio margining and collateral upgrades can be deployed by firms to reduce demand for collateral.

Firms should also think strategically when they consider the methodology they will deploy to calculate IM. Developing, for instance, their own internal models – instead of using the regulations' standardised approach – will provide firms with greater flexibility in their calculations. A large number of firms will also be incentivised to opt for the Standard Initial Margin Model (SIMM) developed by the International Swaps and Derivatives Association (ISDA), because of the benefits it offers (such as significant savings compared to the standard schedules).

Market participants should assess carefully their clearing strategies alongside their central counterparty (CCP) relationships. They have to consider which clearing strategy – being clearing members of a CCP, direct clients of a clearing member, or establishing indirect clearing arrangements – is both available to them and best suits their needs. Finally, having fewer CCP relationships maximises multilateral netting benefits (although increasing overall exposure to each CCP, with attendant capital and large exposures considerations) and centrally clearing trades is the approach regulators look to incentivise, as against entering into non-centrally-cleared transactions.

We argue there is no single optimal target operating model for collateral management and individual firms need to decide whether to outsource or keep in-house the whole or part of their collateral management processes, depending on the size of their derivatives portfolio and business model.

The collateral challenge

The new order



Since 2008 there has been an explosion in the number of references to 'collateral' by policy makers, regulators and market participants. We² do not believe the focus on collateral has reached its peak. Although collateral has been used to mitigate counterparty credit risk for decades, the financial crisis heightened uncertainty around counterparty risk, and has led to secured lending and borrowing becoming the norm for both short- and long-term funding. The use of collateral has risen dramatically, and it is now one of the industry's main risk mitigation tools.

The regulatory response to the crisis has further incentivised the exchange of collateral – and at times mandated it. The most significant of these requirements are not yet fully implemented in Europe; in particular, the clearing obligation and margining requirements for over-the-counter (OTC) derivatives.³ It has been estimated that in the EU €74.9 trillion in non-cleared derivatives⁴ will become subject to the margining requirement, and a further €71.1 trillion will be pushed to central clearing, and consequently subject to posting collateral to meet the CCPs' margin requirements.

Since the introduction of the Basel III capital and leverage requirements, banks have steadily retrenched from unsecured lending and market making activities.⁵ High-quality liquid assets also continue to be in increased demand by banks as prudential liquidity requirements transition to full effect by January 2018. These combined elements will reduce the availability of assets to use as collateral to meet other requirements.

Initially, the industry had concerns that there would not be enough collateral available to meet these increased demands and needs. However, concern has shifted away from a potential shortfall and towards the effects that an uneven distribution of collateral amongst market participants might have. In particular, there might be collateral bottlenecks which prevent participants accessing the right collateral in a timely manner mainly because of a shortage of intermediation capacity.⁶

The scale of change, the need to achieve effective and efficient collateral management, compliance with the plethora of regulatory requirements and operational difficulties combine to present a new collateral challenge. The way that firms think about and manage collateral is changing, and will continue to do so as requirements transition to full effect, especially as efficiencies can generate significant cost savings. Simultaneously of course, banks and investment firms are facing continued pressure to minimise costs and manage down their balance sheets. Collateral management contributes to both these aims.

In this paper we consider the regulatory drivers which make collateral management a priority, the increased revenues or reduced costs that may arise for market participants from an increase in collateral efficiency and the principles and strategies for collateral management that can be deployed in order to increase collateral efficiency and reduce collateral demand.

Since 2008 there has been an explosion in the number of references to 'collateral' by policy makers, regulators and market participants.

Regulatory pressures affecting collateral

Regulatory pressures

The use of collateral as a counterparty credit risk mitigation tool is long-standing and very well-established. However, following widespread concerns about counterparty creditworthiness, starting in 2007-2008, the need to secure positions became even more pertinent.

The response from policymakers has, cumulatively, amounted to a fundamental overhaul of the use of collateral in the regulatory framework. Following their implementation, some of the measures imposed by policymakers will result in increased demand for collateral, while others will place restrictions on the use and availability of existing collateral (although the aggregate impact and challenges of these changes has not yet emerged). While, for good reasons, margin requirements for non-centrally cleared OTC derivatives have grabbed the headlines, they form only one part of the new regulatory framework for collateral. Other requirements, such as restrictions on re-use of collateral, the interplay of collateral with liquidity requirements or reporting of the use of collateral are less well known and are more difficult to assess in terms of their impact.

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Changes to regulation will have, or will likely have, the following aggregate effects:



Substantially increasing the requirements or incentives to exchange collateral



Increasing the demand for eligible high-quality liquid assets (HQLA)



Reducing the ability of firms to re-hypothecate collateral received



Increasing requirements to disclose information on inter alia collateral use, collateral held and posted, the make-up of collateral pools, and how and when collateral is re-hypothecated

Table 1 provides an overview of some of the areas in the regulatory framework resulting in increased demand for collateral and how the requirements fit together. Table 2 presents some of the requirements placing restrictions on the holding of collateral and Table 3 summarises the requirements around the reporting of collateral.

Table 1. Overview of regulations affecting the demand for collateral









	Margin for non-centrally cleared derivatives	The introduction of requirements for the exchange of margin on non-centrally cleared trades under the European Market Infrastructure Regulation (EMIR) will likely cause the single largest increase in collateral demand and be the main driver of changes in collateral management.
	Margin for centrally cleared derivatives	EMIR mandates the central clearing of certain types of derivative contracts. Interest rate derivatives and Credit Default Swaps (CDS) are subject to clearing on a staggered basis from 21 June 2016 and 9 February 2017 respectively.
	Haircuts on collateral	Mandatory haircut floors, particularly for repos and securities lending, are likely to increase the amount of collateral to be posted against the position compared to current market practice. This is a requirement proposed by the Financial Stability Board (FSB), which might be introduced in EU legislation under the Securities Financing Transactions Regulation (SFTTR). ⁷
	Liquidity requirements	Banks and some investment firms will have to manage the competing priorities of sourcing and managing eligible instruments for both prudential liquidity requirements and additional demand for transactional collateral. The Capital Requirements Regulation (CRR) requires liquid assets to be isolated into a separate pool, or under the operational control of a central liquidity function able to monetise the asset without conflicts.
	Secured positions under the prudential framework	Under the revised Capital Requirements Directive (CRD IV) and CRR, secured positions attract lower risk weights, resulting in lower capital requirements. This is likely to incentivise firms to secure positions in order to reduce the capital they must hold, although they should weigh the collateral funding costs against the relief in capital charges.
	Favourable risk weights for centrally cleared derivatives	CRD IV/CRR favour centrally cleared positions over non-centrally cleared positions. Combined with the typically lower margin requirements of CCPs (compared to the margin requirements for non-cleared trades) this will result in the market seeking to clear as many trades as possible.
	Incentives to secure positions so they fall outside of the bail-in provisions	Counterparties might be incentivised to secure positions so they fall outside the bail-in requirements under the Bank Recovery and Resolution Directive (BRRD).
	CCP Recovery and Resolution planning	Under the European Commission's recent proposal for a CCP Recovery and Resolution framework, during the resolution process and subject to the resolution authority's discretion, clearing members may be required to increase their contributions to the CCP's default fund and may receive reduced payments in relation to VM calls.

Table 2. Overview of regulations placing restrictions on, or reducing availability of, collateral





	Restrictions on re-use of collateral	SFTR introduces restrictions on the re-use of collateral, which require that collateral providers should be duly informed of the risks and consequences of re-use and provide their prior written consent.
	Segregation of collateral	The European Securities and Markets Authority's (ESMA's) final draft regulatory technical standard (RTS) on margin requirements for non-cleared derivatives requires the collecting counterparty to have segregation arrangements in place to ensure that collateral posted as IM is available to the posting counterparty in a timely manner, in case the collecting counterparty defaults.

Table 3. Overview of regulations requiring reporting of collateral

	Reporting on asset encumbrance	Under CRR, firms have to report all forms of asset encumbrance to the European Banking Authority (EBA), a requirement that increases the burden of holding encumbered assets.
	Reporting of the collateral held and its use (including re-hypothecation)	Under SFTR, firms have to report information about collateral and its use in securities financing transactions (SFTs).

An area where there is less clarity is the impact on asset encumbrance resulting from the increased use of secured positions.⁸ Increased asset encumbrance reduces the pool of assets available to subordinated unsecured creditors in insolvency. As the proportion of encumbered to un-encumbered assets increases, the risk to unsecured creditors, including depositors, also increases. A lack of transparency on asset encumbrance means identifying this risk and pricing unsecured positions are difficult. Recent changes to the bank prudential regime have reduced the risk of failure of a firm, but incentives in regulation to increase collateral may leave unsecured creditors open to greater losses in the event of a firm's failure. Moreover, if a bank does fail and is subject to bail-in, secured creditors will be exempt from the bail-in process, meaning that more of the burden will fall on unsecured creditors.






Furthermore, additional measures are yet to be finalised and implemented, such as the FSB's proposals to introduce haircut floors for non-centrally cleared SFTs, or measures which may come out of the FSB's work programme on CCP resilience, recovery and resolution.

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Alongside the multiple regulatory initiatives around collateral, there is divergence in the derivatives rules among jurisdictions, in particular between the EU and the US frameworks (as outlined in table 4), which could result in fragmentation in derivatives markets and pose additional challenges for firms regarding collateral management. Although this had begun to change with the adoption of the first equivalence decision by the European Commission on the US regime for CCPs, in the EU the implementation of margin requirements for non-cleared derivatives has been delayed until February 2017. This has put the EU out of step with countries such as the US and Japan, both of which started implementing the requirements in September 2016, in line with the previously agreed international timeline. Although this delay has been a relief for EU firms, as it has allowed them more time to implement the rules, it has caused confusion to EU and non-EU firms that have been counterparties to the same trade and could put US firms at a competitive disadvantage compared to EU firms.

Despite the increased amount of regulation around collateral, there are still a number of legal impediments relating to its enforceability, which are causing uncertainty for market participants and could undermine the regulatory objectives. For instance, differences between national property and insolvency laws across jurisdictions can give rise to uncertainty as to who owns a security in the event of a default, and whose rights take precedence in the event of insolvency. Furthermore, different approaches around the treatment of netting in different jurisdictions create uncertainty in relation to netting enforceability in the event of insolvency.

Table 4. A summary of some of the differences between the EU and US rules in relation to margin requirements for non-cleared derivatives. This is not an exhaustive list

		
 Scope	Physically-settled FX swaps and forwards are subject to VM but not IM.	Physically-settled FX swaps and forwards are not subject to regulatory margin requirements.
 Intra-group transactions	Intra-group exemption applies if certain conditions are met, for both IM and VM.	<p>Prudential regulators: A swap entity is not required to post IM to an affiliated counterparty but IM must be collected from an affiliate that is a financial entity with material swaps exposure.</p> <p>No exemption for VM.</p> <p>CFTC: A covered swap entity is generally not required to collect IM from an affiliate entity.</p> <p>No exemption for VM.</p>
 Concentration limits	Rules include concentration limits.	Rules do not include concentration limits.

Despite the increased amount of regulation around collateral, there are still a number of legal impediments relating to its enforceability, which are causing uncertainty for market participants and could undermine the regulatory objectives.

Collateral efficiency

Collateral efficiency

A recent Bank of England study estimated that the total demand for high-quality collateral currently stands at around \$1.6 trillion.⁹ Although it is safe to conclude that the amount of collateral assets in circulation¹⁰ has increased in the past few years, estimates of its size vary widely, from \$500 billion to \$4 trillion.¹¹

It is important to understand that at any point in time, a firm has little or no influence on the amount of available collateral in the market (essentially it is a price taker). The amount of collateral that a firm needs for its trading activities (the demand for collateral) is mainly driven by its mix of assets, its business model, the economic cycle, the average maturity of its trades and its funding strategies. In the short term, these variables are broadly stable. However, a firm can exert a much greater influence on its need for collateral by altering its collateral efficiency ratio.

Collateral efficiency captures a firm’s ability to move the available collateral through its business units quickly and effectively. It deserves significant attention, as it can have a profound effect on a firm’s revenue stream and cost structure. The role of enterprise-wide collateral management, collateral trading and collateral optimisation (which we discuss in the following sections) is to increase this ratio to the greatest extent possible.

We have estimated that a 1% increase in collateral efficiency could result in approximately \$1.2 million additional revenue per one billion units of collateral for an investment bank (IB) with a collateral surplus.¹² Applying the same methodology to a retail bank with a collateral deficit could result in approximately \$1.09 million in cost reduction for the same units of collateral. The tables below summarise our findings under both normal and stressed market conditions.

Table 5. Additional revenue or reduced cost arising from a 1% increase in collateral efficiency under normal market conditions (in millions)

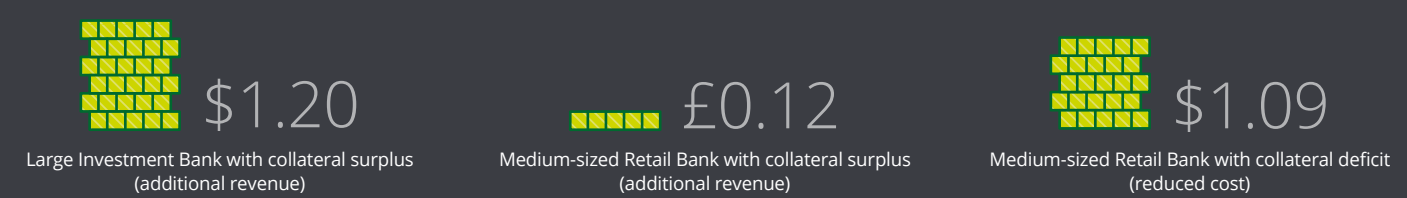


Table 6. Additional revenue or reduced cost arising from a 1% increase in collateral efficiency under stressed market conditions (in millions)



These levels of savings are sufficiently significant to suggest that simply ensuring base level regulatory requirements are met is sub-optimal; sophisticated collateral management has become a

business-critical discipline for some firms. The following sections present emerging best practices for firms in managing their collateral efficiently and thus reducing costs.

Table 7. Methodology for calculation

Methodology

We used an economic approach to calculate the collateral cost/benefit.

A number of market indicators can be used as a proxy for funding cost and the difference between collateralised trade/financing and non-collateralised trade/financing. We used a combination of the generalised collateral (GC) rate, banks' CDS spreads, and the spread between LIBOR-OIS curves for this analysis.

To calculate the collateral cost/benefit, the first step is to calculate the bank's required collateral need for one year.

In our analysis we estimated banks' three-month collateral usage (using data from publicly available information on banks' balance sheets and trading portfolios) and then annualised our figures.

We defined the marginal available collateral as the increase in a bank's available collateral which would result from increasing the efficiency of the collateral by 1%.

After estimating a bank's collateral surplus or deficit we used the appropriate funding curve to determine the cost/benefit to the banks. Our main assumption here is that the banks use collateral swap, repo and GC and bond markets for providing collateral to the market or sourcing it from it.

To provide a better understanding of the impact and dynamic behaviour of collateral optimisation and the cost/benefit associated with it, we present two sets of numbers. The first looks at cost/benefit analysis by calibrating the bank's funding curves, repo, GC and LIBOR-OIS curves to the first three months of 2016. In the second approach we adjusted these figures to a stress period.

We made additional adjustments to the average rating of available collateral and increased haircut charges to take into account that, during market turmoil, banks' pools of collateral will have lower ratings and higher associated haircuts.

For the calculation of the collateral demand and collateral cost/benefit analysis, we relied on a number of third party data and collateral management systems. Although we believe the inputs to and outputs from these systems to be accurate and in-line with our own expectations, we have not independently validated the accuracy of the data, or the risk and pricing models used to create the results we have calculated.

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Principles of collateral management

Smashing the silos: moving towards enterprise-wide collateral management and trading systems

Collateral optimisation is a frequently used term that has no precise meaning because there is no one-size-fits-all solution. However, the attractive economic opportunities that proactive collateral management and trading can offer to financial firms have caused firms to change their view on the subject.

Today, rather than considering enterprise-wide collateral management as a purely regulatory exercise, the industry now recognises it as a strategic tool for generating additional revenue, reducing the cost of funding and deploying capital more efficiently across different business units. However, the transition has proved to be challenging. Legacy collateral systems were built for back office operational workflow as management or trade reconciliation tools, and so lack the capabilities to price, optimise and allocate collateral in real-time with Straight-Through Processing (STP) capabilities. Additionally, in many organisations each desk manages its own inventory of collateral, allowing limited interaction with other desks.

We do not believe there is a single Target Operating Model (TOM) that fits all firms' enterprise-wide collateral management needs. However, there are common elements in every enterprise-wide collateral management solution that each firm needs to consider carefully. As a fundamental starting point, a decision will need to be taken over whether to outsource the function either fully or partially. This may not be straightforward given the multiple collateral utilities that have come to market, as well as the different types of service they offer.

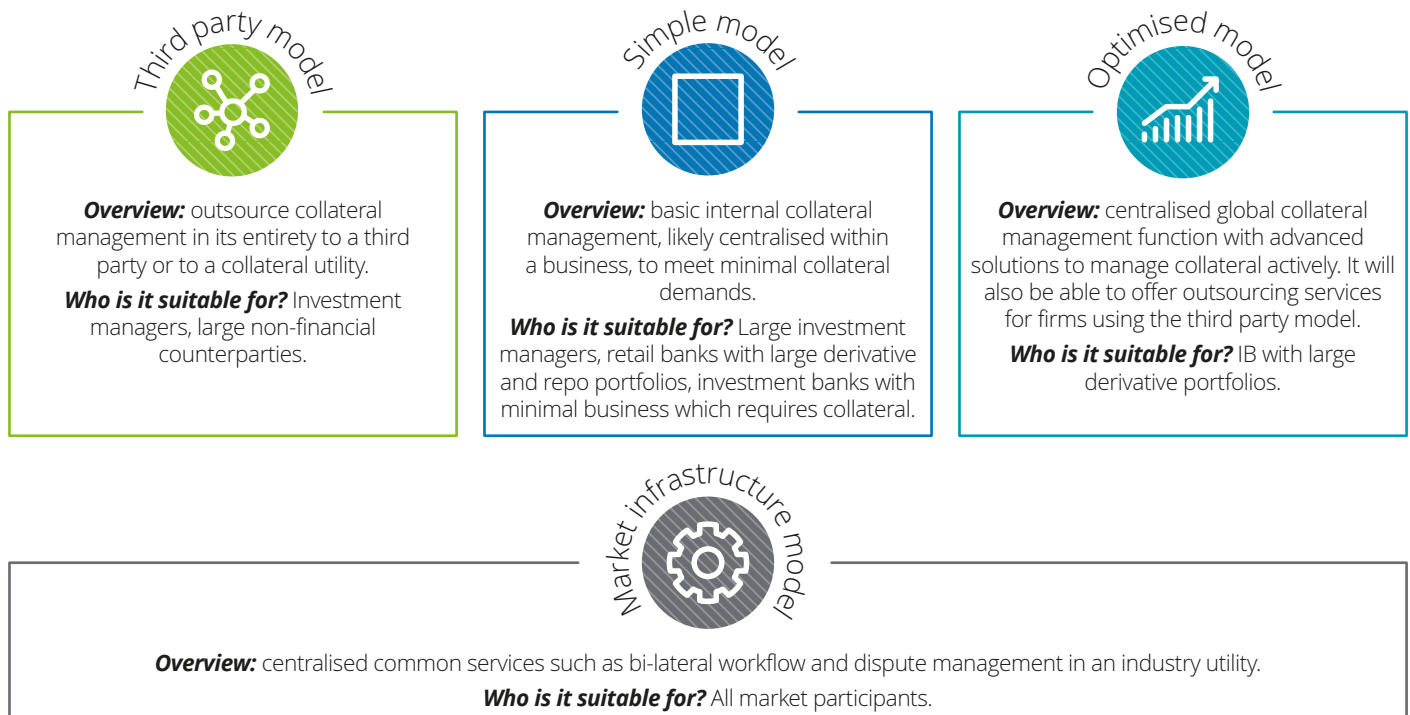
Smaller firms and funds should consider outsourcing collateral management to a third party to reduce their costs and operational burden. Under the tri-party collateral management model, the tri-party agent is responsible for record keeping, accounting, valuation and substitution of collateral, tracking of re-hypothecation, delivery of collateral including margin calls, and maintaining custodial arrangements. On the other hand, firms with large derivative portfolios are likely to benefit from keeping their collateral management in-house and developing advanced strategies to optimise the use of existing collateral and source the necessary additional collateral from the market. These firms could also capitalise on their advanced capabilities and offer outsourcing services to smaller firms.

Other firms that fall between these two options should explore RegTech offerings for basic collateral management needs. Such solutions range from cloud-based services requiring minimal infrastructure to more traditional software packages that provide all the basic functionality needed to run collateral operations. Selecting the best solution in this instance needs careful analysis of both business requirements and also technical considerations around integrating any solution with front office trading platforms and downstream settlement and risk systems.

The table overleaf presents three different TOM options that firms could adopt, depending on their business and collateral needs. Underpinning these three options, there are increasingly important market infrastructure initiatives that aim to centralise and standardise many of the common services required for collateral management. There is an increased market trend for firms with large derivatives portfolios to move some of their collateral management functions, such as collateral valuation and negotiation, to market utilities using a combination of the optimised and market infrastructure models. The decision about which TOM to choose may well depend on the market infrastructure options a firm wishes to subscribe to, as there is a strong interplay between the different models.

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Table 8. Three TOM options for firms

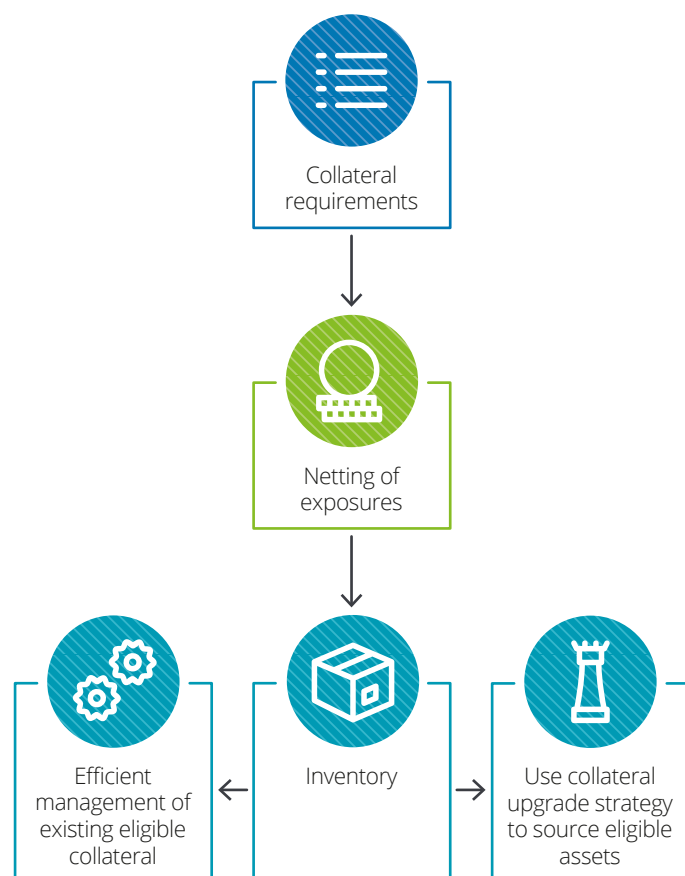


Looking further ahead, disruptive technologies such as blockchain are likely to transform securities settlement and associated collateral management. These offer the potential to reduce costs dramatically, simplify processes and remove multiple applications, reconciliations and integration points. The key change will be the introduction of a distributed ledger representing a single, consistent view of collateral through the settlement chain. Firms should position themselves to participate in and benefit from these developments as they evolve.

Looking further ahead, disruptive technologies such as blockchain are likely to transform securities settlement and associated collateral management.

Principles of 'good' collateral management

The most fundamental principle of managing collateral is having transparency of both collateral needs and collateral inventory across the firm. It is only when these two elements are achieved that netting opportunities can be maximised and inventory can be utilised across business lines – the beginnings of a CCMF.



CCMF

A CCMF should ideally be responsible for managing collateral on an enterprise-wide basis and could be located in the treasury function, so as to be able to manage overall balance sheet utilisation. Alternatively, depending on the size and business model of the firm, the CCMF could be split across the treasury function, the operations function and the credit, funding and capital valuation adjustments (XVA) desk, with each having specific roles and responsibilities. The treasury function would be responsible for sourcing and managing the centralised collateral pool and the XVA desk for pricing. The operations functions, the historical owner of collateral management, could then play a more active role as new regulations will require more expertise, for instance understanding the IM calculations. Regardless of where different parts of the CCMF are located, it should have authority to manage collateral across the group, rather than being managed at the trading desk, or operating unit level. The CCMF should have a single view of assets and liabilities and be supported by monitoring tools to assess current and forecast future collateral positions and requirements. As collateral management is one part of a multi-faceted process within a financial institution, this central function should also have close ties and coordination with the functions responsible for capital and liquidity management.

Controls and governance

The CCMF should be subject to a suitable controls and governance framework so as to ensure validation checks of margin calls and margin calculations. It should also have a reporting line to executive management. Suitable management information should form a key aspect of this controls and governance framework, including the ability to monitor current and impending regulatory compliance. The CCMF should be subject to scenario, resilience and continuity planning as part of a firm's broader risk management framework (e.g. internal liquidity adequacy assessment process), with a particular focus on preparing for periods of illiquidity and volatility.

Infrastructure

The CCMF should have an integrated IT platform that offers a real-time view of collateral, including reporting of collateral demands, netting, valuation and pricing. The platform should also be able to segregate collateral and monitor re-hypothecated positions. Ideally, it should not only calculate margin calls, but also monitor open positions and model future collateral needs. It should also have direct connectivity with the necessary external infrastructure such as custodians and CCPs, so as to be able to offer STP.

Collateral policy

Firms need to have a clearly articulated collateral policy setting out the following:

- suitable arrangements for the sourcing of collateral;
- make-up of a collateral pools;
- the parameters of appropriate segregation requirements and preferred methodology;
- the appropriate use of pledge or title transfer agreements;
- the permissibility of collateral re-hypothecation and lending;
- when collateral transformation or collateral upgrades are appropriate; and
- risk management and stress testing procedures that are in place.

These policies should also consider collateral suitability parameters on a country-by-country basis, as the CCMF should have authority over and oversight of a firm's global collateral needs.

Collateral sourcing

Firms should, in particular, develop a short-term strategy for sourcing additional collateral in the event of adverse market conditions. These strategies need to incorporate how collateral can be sourced and used during periods of market volatility, which will likely create a spike in demand. Although the effects of such spikes on collateral needs should be reduced due to requirements that collateral models are not pro-cyclical, an increase in haircuts in periods of stress will still probably occur. In developing their sourcing strategy, firms should take account of these potential increases in haircuts as they will result in the need to post additional collateral against their positions. A further consideration for those UK banks which are subject to ring-fencing requirements is the restrictions the non-ring-fenced bank faces in using the ring-fenced bank's assets as collateral. In essence, the non-ring fenced bank will be required to source collateral from the ring-fenced bank on the same commercial terms as with any other third party and subject to the relevant large exposures restrictions.

Documentation

Most firms will need to revisit their documentation ('repapering') in light of the introduction of margin requirements for non-cleared derivatives. In particular, firms subject to these requirements will have to put in place – if they have not already done so – new documentation for the exchange of IM and VM, increasing the complexity of documentation management. This provides an opportunity to implement standardised rules and procedures which would make firm-wide collateral management easier, rather than dealing with bespoke parameters. Industry bodies are doing much to develop standard industry documentation. Examples are ISDA's production of regulatory-compliant credit support annexes (CSAs) and development of an industry- and regulator-approved IM model.¹³ Firms, however, will encounter difficulties in dealing with multiple legal documents, each of which has specific information (e.g. reporting currency or IM threshold) which needs to be taken into account when calculating sensitivities and exposure for counterparty credit risk. Ideally, legal agreements should be integrated into the IT infrastructure. There are some early industry initiatives which aim to introduce utilities that can negotiate and capture CSA terms.

Collateral pricing

Sufficiently transparent transfer pricing agreements need to be put in place between the CCMF and trading desks to recharge the costs of collateral and CCMF services to the desks. Trading desks should have full visibility of the costs of collateral so they can be priced into trades and consequently reflected in the relevant business unit's costs. Here again ensuring as much automation of this process as possible will reduce errors and the overall administrative burden.

Today, rather than considering enterprise-wide collateral management as a purely regulatory exercise, the industry now recognises it as a strategic tool for generating additional revenue, reducing the cost of funding and deploying capital more efficiently across different business units.

Resolution planning

Putting in place advanced systems and controls will not only increase firms' collateral management efficiencies but will also help them meet regulators' expectations around resolution planning arrangements. US regulators – in particular the Federal Reserve Bank and the Federal Deposit Insurance Corporation – have already provided feedback on the resolution planning arrangements of eight systemically important US banks, highlighting that they should 'possess fully developed capabilities related to managing, identifying, and valuing the collateral that is received from, and posted to, external parties and its affiliates'.¹⁴ Although the European resolution authorities are not expected to provide such public feedback, we do not expect them to take a fundamentally different approach in their demands of banks. Alongside building 'resolution robust' collateral management systems as part of their resolution planning arrangements should also consider gaining a stronger understanding of likely counterparty collateralisation requirements in a resolution scenario, particularly from Financial Market Infrastructures (FMIs) such as CCPs. Doing this will require heightened data capabilities and banks should address this in tandem with ongoing work to enhance data management.

These are the fundamental principles of good collateral management. In addition, there are more sophisticated practices that are deployed by some firms so as to ensure maximum cost reduction and return on inventory. These are presented in the following section.

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Collateral management approaches

Strategies and initiatives

Firms, in particular those with large derivatives portfolios, use a number of strategies and initiatives to make sure they are utilising their collateral inventory in the most efficient way possible and also achieve lower levels of collateral required to be posted for their transactions. We analyse some of the most commonly used techniques below.

Strategies and initiatives that increase efficiency

Matched book dealing

Firms often refer to a balance sheet where repos finance offsetting reverse repo agreements as a 'matched book'. In essence, this means a client provides a security as collateral in exchange for cash, and grants the bank the right to reuse this collateral. The firm re-pledges this security to another client to source the cash. As a result, the firm's balance sheet does not reflect any mismatch between assets and liabilities. The firm earns a margin (the spread between the rate paid to lenders and that charged to borrowers) which compensates the firm for its higher creditworthiness relative to the other parties in the transaction, and any rollover risk.

If the firm is unable to use one customer's collateral to secure a loan from another customer, it may be forced to borrow on an unsecured basis to source the cash, or use some of its own collateral. In either case these transactions would have higher costs for the firm, and this may change an attractive trade into an uneconomic one from the firm's point of view.

Internalisation

In some cases the firm can source financing for its customers internally, without the need to use the external money markets. Internalisation allows a firm to generate additional income from finding and matching the same security among its own customers. In particular, a firm that provides funds collateralised by client securities can then re-use¹⁵ these securities to finance another client transaction. Through internalisation financial firms can achieve another source of collateral efficiency.

This strategy can present firms with regulatory advantages from a capital and leverage perspective. By eliminating the need to engage in (additional) external repo and securities borrowing transactions, a firm minimises the size of its balance sheet, whilst being able to deploy existing capital more efficiently. A second advantage arises from the fact that the firm may be able to finance its own positions with client activity. For example, a market-making desk which is long on a security can, under some circumstances, deliver its own inventory to a client that sells short that same security. The firm benefits significantly from this form of internalisation as it earns a fee on the client's short, and saves on the financing cost of its own inventory for its market making activities.

Market infrastructure

Market participants should scrutinise their clearing strategies alongside their CCP relationships. Having fewer CCP relationships maximises multilateral netting benefits,¹⁶ and clearing trades is overall cheaper than a non-cleared OTC derivative position.¹⁷ Portfolio margining, mentioned below, is an example of how firms can benefit from routing similar transactions to a single CCP. This could, however, give rise to concentration risk. If the CCP becomes distressed, the disruption to the financial markets and the economy would be severe. Under the recent European Commission proposal for a CCP Recovery and Resolution framework, clearing members may be required by the resolution authorities to have their contracts terminated (partially or fully), contribute additional collateral to the CCP's default fund and receive reduced VM payments. Trading could also be disrupted if trading venues were served by the same CCP.

Firms use a number of strategies and initiatives to make sure they are utilising their collateral inventory in the most efficient way possible and also achieve lower levels of collateral required to be posted for their transactions.

When it comes to clearing strategies, firms have a number of options under EMIR; they can be clearing members of a CCP, direct clients of a clearing member, or establish indirect clearing arrangements. Firms should assess the optimal approach based on their derivatives portfolio and the options available to them. CCPs set stringent requirements for a firm to become a clearing member, including creditworthiness, operational capabilities, minimum trading activity in covered derivatives, contributions to the CCP's default fund and participation in the default management process. That said, there can be a significant difference between the overall costs of using one CCP over another, particularly due to the differing levels of collateral that are required to be posted to resolution funds, and in some cases a significant divergence in the collateral concentration limits imposed upon those funds. The additional costs and operational burden from becoming a clearing member of a CCP is expected to cause most entities to enter into a relationship with one or more clearing members to clear their transactions.

Besides the traditional client clearing model, emerging industry solutions are designed to allow financial markets participants, in particular buy-side firms, to become direct members of a CCP. Several CCPs are considering offering sponsored direct access to buy-side firms that would allow them to have separate margin and asset accounts with the CCP, provided that those firms have a sponsor to contribute to the CCP's default fund. These solutions respond to banks' reduced appetite to offer client clearing services due to increased capital costs. Under these models, collateral has to be posted with the CCP directly, rather than going through a bank's books where it would affect capital requirements. The challenge, however, for buy-side firms will be to factor in the operational cost of becoming a direct member of a CCP and find a clearing broker prepared to contribute to the default fund.

Strategies that affect collateral demand

Portfolio margining

Margin can be calculated on a gross basis, where the amount of the margin required is based on each individual position of the portfolio, or on a net basis, where margin is calculated across all positions. Under the latter approach, each position is considered in conjunction with the others in the portfolio. Portfolio margining is the strategy whereby margin is calculated on the basis of a portfolio that consists of derivatives positions which are negatively correlated and thus are offset against each other. This results in lower levels of risk and thus lower required margin.¹⁸ This strategy can be used for both cleared and non-cleared derivative transactions.

A number of CCPs offer portfolio margining solutions to their members in relation to their cleared trades. This strategy can yield positive results when similar instruments are cleared by the same CCP. In Europe, where different asset classes are cleared by different CCPs, the netting benefits deriving from portfolio margining are reduced.¹⁹ The impediments caused by the fragmented clearing market can be addressed through the establishment of interoperability arrangements between CCPs.²⁰ This would allow members in one CCP to clear trades with members of the interoperable CCP and benefit from multilateral netting. Therefore, market participants should consider which CCPs have such arrangement in place in order to maximise their netting benefits. Market participants that use portfolio margining to calculate their margin for non-cleared transactions could explore ways to broaden the scope of the tool by, for example, using it on a cross-region basis. There are also a number of emerging industry solutions using portfolio margining for both cleared and non-cleared transactions.

Collateral upgrade

The increase in demand for high quality liquid assets has placed significant pressure on firms in terms of sourcing eligible assets to be posted as collateral. To address this challenge, firms are engaging in collateral upgrades or collateral transformations that allow them to swap a lower quality, hard to pledge, illiquid or even non-acceptable collateral into higher quality collateral such as Treasury bonds. According to the International Organization of Securities Commissions (IOSCO), increased demand for highly liquid collateral is expected to drive demand for collateral transformation services.²¹

Collateral upgrades can be achieved through repo and securities lending transactions. A market participant can lend lower grade securities for cash and then use the cash received to source eligible securities. The tri-party repo market is an example of an industry solution that facilitates the execution of these transactions by delegating some of the operational requirements of a repo trade to a third-party repo agent. The tri-party market is a GC market, meaning that a participant may care more about the asset class of collateral it receives and less about the specific security. The tri-party repo market in the US has accounted for about \$1.6 trillion of securities funding, while in Europe around 10% of the 6 trillion euros of contracts in repos and reverse repos are tri-party contracts.²² Finally, collateral can be transformed through central bank lending. These collateralised loans are similar to repo transactions and they allow firms to pledge a wide range of securities with central banks in exchange for cash.

The increase in demand for high quality liquid assets has placed significant pressure on firms in terms of sourcing eligible assets to be posted as collateral.

Margin models

In advance of the implementation of margin requirements for non-cleared derivatives, firms should consider the methodology they will deploy to calculate IM. Both the US and EU frameworks give firms an option between a standard schedule specified by the regulators and an alternative model approved by the regulator. The standard schedule is quite conservative and does not provide firms with flexibility in calculating IM. Some firms – in particular those with the most substantial portfolios – will choose to develop their own models. ISDA has estimated that under the standard model the total IM for the market would be \$10.2 trillion compared to \$1.7 trillion under internal models.²³ The models will need to be robust and flexible, and not be subject to pro-cyclical effects. They should also be able to verify IM by replicating the models used by their most significant trading counterparties, monitor open positions, model future collateral needs including scenario analysis and forecasting, and evaluate netting.

ISDA has developed SIMM that would allow firms to calculate IM based on a single industry agreed model. We expect that many firms will choose to utilise this model, as the savings are significant compared to the standard schedules, but without the costs or burden of seeking regulatory approval of a firm's bespoke model.

Using different models rather than standard schedules may result in discrepancies in the amount of margin calculated by two counterparties in the same transaction and thus give rise to disputes on margin calculations. This could result in a significant operational burden, or the risk that some smaller counterparties may not have the capabilities to perform the complex calculations necessary and may choose an alternative counterparty as a result. Another way market participants may limit disputes would be to include contractual clauses on margin calculations. ISDA's new Standard CSA removes optionality which exists under the current CSA by promoting consistent and transparent valuations.

Conclusion

Competing regulatory pressures for collateral and high quality instruments, such as the new margin regime for non-cleared derivatives, as well as prudential requirements around liquidity, will result in an unprecedented demand for such assets. Although we do not expect a shortage of collateral in the market, the increased demands for, and on, collateral present challenges for firms in terms of managing their existing inventory efficiently as well as sourcing additional collateral. In their attempts to meet upcoming regulatory requirements, firms are now revisiting their collateral efficiency and strategies.

We do not think there is a 'one size fits all' solution. Firms should adopt a TOM for collateral based on their business structure and operational needs. Smaller firms could consider outsourcing part or all of their collateral management function, while larger firms may find it more beneficial to manage their collateral in-house. Such firms should consider establishing a centralised function accountable for maximising collateral efficiency that has a single view of all the assets and liabilities and is supported by appropriate IT infrastructure, a robust collateral policy, and appropriate controls and governance frameworks.

To maximise collateral efficiency, firms are deploying a number of more sophisticated strategies. Some of these solutions, including matched book dealing and internalisation, ensure that existing inventory is utilised in the most efficient way, while others such as collateral upgrades are used to facilitate the sourcing of high quality assets.

Effective and efficient collateral management can significantly reduce the costs and operational burden imposed by regulatory requirements. Given that the implementation phase for margining of non-cleared transactions has already started in some jurisdictions, including the EU, the pressure for firms to address the collateral challenge is already acute. The methods and approaches set out in this paper provide good practices for firms to review and adopt.

We do not think there is a 'one size fits all' solution. Firms should adopt a TOM for collateral based on their business structure and operational needs.

Endnotes

1. Please refer to page 18 on collateral management approaches, for a definition of matched book dealing.
2. Deloitte LLP.
3. The first clearing obligation began phasing in from June 2016. For the timeline, see Commission Delegated Regulation (EU) 2015/2205, Official Journal, December 2015. Margin requirements for non-cleared derivative transactions will apply in the EU on a staggered basis from February 2017, Commission Delegated Regulation (EU) 2016/2251, Official Journal, December 2016.
4. Joint Committee of the European Supervisory Authorities (ESAs), Final Draft Regulatory Technical Standards on risk-mitigation techniques for OTC-derivative contracts not cleared by a CCP under Article 11(15) of Regulation (EU) No 648/2012 and accompanying cost benefit analysis, March 2016.
5. Committee on the Global Financial System, Market-making and proprietary trading: industry trends, drivers and policy implications, November 2014 and Bank for International Settlement (BIS), Shifting tides – market liquidity and market-making in fixed income instruments, March 2015.
6. Bank of England, Staff Working Paper No. 609, The role of collateral in supporting liquidity, Yuliya Baranova, Zijun Liu and Joseph Noss, August 2016.
7. These proposals are not part of the EU regulatory framework although the SFTR provides that the European Commission should submit a report to the European Parliament and to the Council by 13 October 2017 on progress in international efforts to mitigate the risks associated with SFTs, including the recommendations for haircuts on non-centrally cleared SFTs, and on the appropriateness of those recommendations for EU markets.
8. According to the EBA, the main sources of asset encumbrance, i.e. balance sheet liabilities for which collateral was posted by institutions, are repos, covered bonds issued and over-the-counter derivatives. EBA report on asset encumbrance, September 2015.
9. *Supra*, footnote 6.
10. This is a subset of the total eligible collateral and is different from the term 'collateralised market'.
11. Bank of England, OTC derivative reform and collateral demand impact, October 2012, US Office of Debt Management Fiscal Year 2013 Q2 Report, Availability of High-Quality Collateral, Committee on Global Financial System, 2014, Asset encumbrance, fiscal reform and demand for collateral assets, CGFS papers, N49
12. Please refer to the methodology (Table 7).
13. See ISDA's webpage on the SIMM initiative.
14. Board of Governors of the Federal Reserve System and Federal Deposit Insurance Corporation, Resolution Plan Assessment Framework and Firm Determinations, 2016.
15. Re-use of collateral should be subject to the restrictions set out in SFTR. Collateral can be re-used with the express consent of the providing counterparty, once it has been informed of the inherent risks, and only after the collateral has been transferred to the counterparty's account.
16. The European Systemic Risk Board's (ESRB's) response to ESMA on the temporary exclusion of exchange-traded derivatives from Articles 35 and 36 of MiFIR, February 2016.
17. BIS, Regulatory reform of over-the-counter derivatives: an assessment of incentives to clear centrally, October 2014.
18. E.g. holding a long futures position on a 10-year Treasury but is often a hedge against the fixed rate payments due under a 10-year interest rate swap. As interest rates change, the value of each position will move in opposite directions.
19. ESRB Report to the European Commission on the Systemic Risk Implications of CCP Interoperability Arrangements, January 2016.
20. In the EU, there are a number of interoperable links between CCPs for equities, bond and exchange traded derivatives. ESMA Final Report on possible systemic risk and cost implications of interoperability arrangements, March 2016.
21. IOSCO, Securities Markets Risk Outlook 2016.
22. London School of Economics, The Economics of Collateral, Ronald W. Anderson and Karin Jøeveer, May 2014.
23. ISDA, Initial Margin for non-centrally cleared swaps – Understanding the systemic implications, November 2012.

Notes

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