A Systematic Approach to Optimizing Collateral

We believe that by eliminating IT silos and creating a centralized collateral management system, departmental and financial services firms can achieve sizeable savings and a sustainable competitive edge.
Executive Summary

As collateral takes center stage in financial markets, demand is expected to drive up its cost. Certain scenarios envision an acute supply crunch in times of prolonged market stress. This makes the case for building a robust collateral management/optimization infrastructure all the more compelling. But creating an efficient infrastructure is, unquestionably, a hard task. The key question confronting financial firms is: “Do we have the ability to post the least-cost collateral against obligations enterprise-wide, and to monitor and dynamically alter the posted collateral – its character and composition – in step with constantly shifting market dynamics?” Our experience suggests that there are firm-level structural rigidities that inhibit large broker dealers, banks and custodians from attaining this capability.

Our analysis shows that the industry can collectively and sustainably save anywhere between US$1.0 and US$4.0 billion annually by adopting the robust optimization program we outline here. This level of incentive can create a transformative impact for winning firms and give them a sustainable competitive edge.

In this paper, the second of three in our series on collateral management, we discuss the advantages of developing a robust collateral management/optimization infrastructure. In the first paper, we elaborate on factors that drive collateral demand; in the third, we examine the impact of new margin requirements on derivatives trades.

The Collateral Demand-Supply Imbalance

A combination of regulations – the new liquidity coverage ratio (LCR) provision mandated by Basel III, increased initial margin requirements for cleared derivatives and margining needs for non-cleared derivatives – is expected to spike demand for high-quality collateral. (For additional insights, read: “Collateral Conundrum: A US$11 Trillion Opportunity?”). The Treasury Borrowing Advisory Committee’s (TBAC) assessment of incremental demand for high-quality collateral pegs it at US$2.6 to US$5.7 trillion under normal market conditions, and US$4.6 to US$11.2 trillion under stressed conditions. Growing demand, coupled with the shrinking AAA sovereign pool and preclusion of rehypothecation mandated by new clearing and margining standards, will further choke supply. TBAC estimates the supply of high-quality collateral to be in the range of US$9.2 to US$10.6 trillion under normal market conditions, and US$4.4 to US$8.8 trillion under strained conditions. While we do not subscribe to the scarcity theory, we believe the demand-supply imbalance can turn acute in an unstable market – spiking the cost of high-quality collateral and disproportionately affecting market players.

The Case for Collateral Optimization

As high-quality collateral greases the wheels of financial markets and demand raises costs, it is prudent to invest in the necessary capabilities to optimize collateral usage.

For example, consider total return swaps (TRS), a credit derivative used for off-balance-sheet transactions by asset managers and banks. Simply put, TRS is a bilateral contract to exchange the return on one or more underlying assets. “Total return receiver” (typically a hedge fund) must pay a funding cost (floating rate plus swap spread) to “total return payer” (typically a bank or dealer) in exchange for the total return on an asset. The total return payer (or the “funding bank”) most often requires an upfront posting of collateral by the total return receiver (or “swap counterparty”).

If a hedge fund has to choose among cash, treasury securities or corporate bonds to post collateral, then its total economic return depends on the income generated by the underlying asset and its capital appreciation – minus the cost of collateral and the opportunity cost of deploying a particular asset for collateral.

Total Economic Return = Income + Capital Appreciation - Cost of Collateral - Opportunity Cost of Collateral

To optimize collateral usage and make smart asset selections, the receiver needs to have a consolidated view of the asset book with its range of quality of assets.
Structural Rigidities Impede Optimal Collateral Use

In our experience, factors hindering optimal collateral usage are largely internal, firm-level structural rigidities around operations, technologies and governance.

• **Operational silos:** In every large firm, each product division operates as a silo, with a distinct organizational and governance structure, and operating methods and processes underpinned by a custom-built application and technology infrastructure. These silos can impede and undermine the management of firm-wide assets - cutting across product, business-line and geographical boundaries.

• **Data:** Standardized data that is created, updated and disseminated on a real-time basis is a critical prerequisite for breaking down organizational silos and helping firms manage exposures and collateral settlement. Yet standardizing data remains a major challenge across firms.

• **Collateral optimization capability:** In a dynamic market environment, firms also must grapple with the challenges of monitoring

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**Quick Take**

**The OTC Derivatives Collateral Management Process**

• **Inventory capture:** Front-office personnel will trade in eligible, high-quality collateral assets and notify the collateral operations team of the available assets that can be used to pledge for margin calls from counterparties. The collateral management system will receive these assets as collateral inventory from the firm’s accounting system. Assets in this inventory can include high-quality liquid instruments like U.S TIPS and U.S. Treasury bills, notes and bonds, depending on the firm’s derivative contracts and its collateral eligibility.

The collateral operations team can use assets from two types of inventory to pledge for margin calls: the assets that they receive from the front office through the accounting system, and the rehypothecatable assets that they have received from the counterparties as part of the firm’s margin calls.

• **Contract details:** When two parties enter into a bilateral OTC agreement, they will document the details of the contract in an ISDA master agreement, which is published by the International Swaps and Derivatives Association. Credit Support Annex is widely used in most master agreements to document provisions concerning the collateral that is used by the parties in the derivatives contract. It could include information like re-hypothecation, threshold and types of collateral that may be used in the contract.

• **Margin calls:** Parties in the OTC contract may require the other to post an initial margin amount to cover the credit risk that could arise from trading with that party. This amount is normally pledged by the required party as a margin amount to trade with the party with a higher credit rating. Per the documented collateral terms of the derivatives contract, parties will monitor their exposures on the OTC derivatives trades and will calculate the amount that they will pledge or receive as collateral, based on which party the exposure favors. This is called the variation margin, since it covers for the daily mark-to-market variation in the derivatives trade value.

• **Prioritization rules:** Parties can set the prioritization rules for the OTC agreements and define the order in which they need to pledge different instrument types. For instance, a firm may want to pledge corporate bonds to a counterparty (if available in inventory) before it can pledge treasury bills or assets with better liquidity. IBM Algo Collateral Management v5.3 has incorporated a basic optimization tool that utilizes the prioritization rules to automatically pledge collateral assets to counterparties through straight-through processing (STP). This is done by taking sequential paths in which the system will take one margin call at a time and will assign collateral per its prioritization rules.
and calculating exposures that span products, business lines and geographies. Typical challenges firms face include the tasks of continually monitoring their asset portfolio, ensuring that posted collateral is maintained at an optimal level in volatile market conditions, and being able to deftly reallocate collateral for optimal gains.

- **Variable operating practices:** Today, operating practices vary across asset classes. While OTC derivatives come with rigorous documentation and a clearly defined process for calculating and communicating collateral, the standards around repo and securities lending are lax.

**The Challenges**

Apart from the costs involved, there are various other challenges that a firm faces while building a collateral optimization engine:

- The complexity involved in building in-house optimization software versus buying a tool from the market.
- Tools such as Calypso and Algo are available; however, they need to be integrated with existing systems and/or workflows.
- Tools exist to help resolve mathematical problems, but they require additional expertise — such as quant teams and business subject matter experts (SMEs) who can work together to meet pre-set optimization objectives.
- Also, once an optimization engine is built, it must be continuously upgraded with complex algorithms to meet proportionate increases in volumes and address other factors that could impact the collateral business.
- The optimization engine cannot operate as a stand-alone system. It needs to be integrated with existing systems and other workflows — thus bringing its own set of challenges.

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**Collateral Management: High-Level Flow for OTC Derivatives**

![Diagram](image-url)

**Figure 1**

*Front Office* ➔ *Trade Communications* ➔ *Accounting System*

- *Collateral Management System*
  - Net Exposures
  - Margin Calculations
  - Prioritization Rules
  - Optimization Layer
  - Receive Collateral ➔ *Pledge Collateral*

- Net Exposures ➔ *Margin Calls Communications*
  - OTC Counterparty
  - Collateral Movements ➔ *Custodians*

- Collateral Movements ➔ *Security/Cash Collateral Movement Instructions*
  - Collateral Inventory (Client-Owned)
  - Broker-Owned Re-hypothecatable Assets

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Quick Take

Tabulating the Gains

Assuming incremental annual demand for high-quality collateral = US$11 trillion

Efficiency gains through a central collateral management agency = 7% to 10%
Efficiency gains through a robust optimization engine = 5% to 7%
Total efficiency gains = 12% to 17%

Incremental demand met through efficiency gains = US$1.3 to US$1.9 trillion
Assuming the cost of high-quality collateral ranges between 10 bps to 20 bps
Cost saved through collateral optimization = US$1.0 to US$4.0 billion

Establishing An Optimization Roadmap

In our view, the following roadmap can help firms establish a robust optimization program. Collateral optimization gains of 12% to 17% can easily save the industry US$1.0 to US$4.0 billion annually (see sidebar).

We suggest a three-pronged approach to launching an efficient, effective collateral optimization program:

• First, create a central collateral management agency - a provision to drive collateral optimization by eliminating organizational silos, multiple operational structures with disparate IT systems and infrastructures that can have conflicting objectives. By adopting an enterprise-wide view, firms can improve their collateral usage efficiency by 7% to 10%.

• Second, before embarking on an ambitious and expensive transformation program to address the collateral shortfall, firms must optimize their collateral portfolios with smart analytical tools and adopt effective optimization operating disciplines. This is a difficult road but a cost-efficient one. The collateral optimization exercise is a complex program that takes into account the following provisions, which can add another 5% - 7% to the overall efficiency of collateral usage:
  - Contractual agreements that specify the collateral eligibility criteria agreed upon by the participants, including contract details and a subset of preferences within the contract.
  - Available inventory and trades and/or liabilities to collateralize – position data, trade data, reference data, static data, pricing, rating, etc.
  - Constraint variables in the form of concentration limits across securities and currencies, and asset allocation preferences - currency, security type, security volume, define at trade level, define at portfolio level.
  - Additional influencing parameters for optimization are margins, haircuts, ATVs based on different time frames, market capitalization, regular business events and corporate actions, release requests and substitutions.

• Third, after implementing a comprehensive optimization of available collateral inventory against obligations, firms must address the collateral shortfall through time-tested strategies such as upgrade trades, securities lending, margin financing and secured credit. This must be the last recourse to plug the gaps in the portfolio, since it entails costs that will be priced by the collateral demand at that point in time.

Before embarking on an ambitious and expensive transformation program to address the collateral shortfall, firms must optimize their collateral portfolios with smart analytical tools and adopt effective optimization operating disciplines.
Looking Forward: Smoothing the Path to Optimization

Firms focused on gaining sustainable competitive advantage must create a central collateral management agency with an enterprise-wide mandate to optimize collateral usage. This agency will underpin all optimization efforts and deliver a sense of purpose and direction to the firm’s objective. Once the enabling infrastructure is in place, firms must focus on optimizing the collateral portfolio in a cost-efficient way, then, as the last step, rely on portfolio transformation techniques to augment the need for high-quality collateral.

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