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Whitepaper

Real time Collateral Valuation

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Contents

Introduction

The global financial crisis and the aftermath of it has brought into renewed focus, a hitherto, much ignored financial bellwether - Collateral Management.

In retrospection, bankruptcy of "too-big-to-fail" banks such as Bear Stearns and Lehman Brothers triggered credit confidence to erode, and raised collateral haircuts upwards by five points on average since 2008. As a result, demand for high quality collateral – cash and highly liquid securities skyrocketed. Additionally, the supply of high quality liquidity plunged, especially after the sovereign debt crisis. The liquidity crisis that followed during the second phase of the sovereign debt crisis drove banks to adapt their cash and collateral management activities in a more efficient way to meet the new market demand.

With the entire financial system under heavy scrutiny, regulatory institutions in Europe and the US launched a new set of requirements to govern Financial Institutions in order to:

- Internally reduce net expositions impacting bank assets through specific mandatory adjustments, such as Risk Weighted Assets, Credit Value Adjustment, and CVA VaR (Value at risk) or additional set of liquidity buffers (Basel III European regulations).

- Improve transparency and collateralization of sensitive products – such as derivatives and especially swaps (CDS, Interest Swaps) to encourage Financial Institutions to clear their trades with a Central Counterparty and isolate or compartmentalize a great part of their counterparty risks.

Regulations under Collateral Management

1. Collateral requirements under Dodd-Frank Act (DFA)
2. European Directive on Institutions for Occupational Retirement Provision (IORP II)
3. European Regulation on over-the-counter (OTC) derivatives and Central Counterparty
4. Regulatory impact of Globally Systemically Important Bank (G-SIB) designation European Directive and Regulation on Markets in Financial Instruments
5. European Directive on UCITS V Basel III (including Liquidity Coverage Ratio (LCR)/Net Stable Funding Ratio (NSFR))
6. European Insurance Directive (Solvency II)
7. Collateral initiatives introduced by the Basel Committee on Banking Supervision
8. and the International Organization of Securities Commissions (BCBS-IOSCO)
9. European Directive on Alternative Investment Fund Managers (AIFMD)
10. Vickers Report
11. Financial Stability Board (FSB) - Shadow Banking

As seen above, a plethora of Regulations across markets worldwide will witness an increasing demand for high end collateral, not only towards margin requirements, but also on account of the framework for liquidity, recently introduced. Firms will have no other option but to optimize their collateral management process/systems. Until recently, a collateral, by and large, was viewed as a buffer against client exposure or shortfall in margin requirements.

Basel eligible collateral and recommended haircuts served its purpose, initially, at least. However, in times of market upheavals or sudden movements in stocks/indices, collateral as a buffer failed to provide the much needed succour when exposures increased and collateral value decreased, leading to huge losses. Another key issue was liquidity and the absence of real-time collateral valuation.

Several firms report the Mark-to-Market values at the end of day derived from live market feeds or third-party market utilities. Internal valuation was rarely done, unless an emergency deemed it necessary (client credit quality, industry recession, etc), many firms would simply carry forward the value from the previous day. Further exacerbating the complexity was the IMM (Internal Model Methodology) waiver under Basel 2 and 3; IMM trades were given priority and collateral apportioning was done with the maximum amount attributed here, and the rest to the non-IMM trades known as Current exposure methodology.

Take a foot backward and dwell on the aspects of real-time valuation. Firms considering such an exercise will also need to factor in aspects like impact on the company's cash-flow and potential operational risks.

With the introduction of several regulations and the overlap of reporting attributes in several reports though less complex, however, increased the complexity of the collateral management process. To cite an example of the overlap consider BASEL 3 - MPOR or Margin Period Of rRisk - MPOR - refers to the time period from the most recent exchange of collateral covering a netting set of OTC derivative contracts, with a defaulting counterparty until the financial instruments are closed out and the resulting market risk is re-hedged. Another recently introduced European directive on Bank Resolution and Recovery – the MREL report has introduced several new/modified attributes such as `close out amounts', early termination amount, both of which rely on collateral valuation to arrive at a number that has to be reported.

The above examples are just a glimpse of the larger than life role that the Collateral has and will play, slowly taking on a stellar role transforming itself as an increasingly important, business-critical issue for a much diverse range of institutions active in the global securities and derivatives markets going forward. This encompasses banks, brokers, investment managers, portfolio managers, hedge funds, pension funds, sovereign funds, insurance firms, and other boutique asset owners. To a lesser extent, non-financial organizations will also be drawn further into the collateral world, primarily due to their use of OTC derivatives, and as providers of cash via the repo markets, where they will need to balance yield with security, taking secured exposure over unsecured Bank deposits.

The ensuing pages are devoted to examining the practice of collateral management (briefly) of the yesteryears and ever since the financial crisis, emphasizing critical conditions for effective and robust collateral management.

Prudential Collateral Management

The primary reasons why Collateral optimization cannot be achieved is the 'silos' that they operate in, often unconnected or linked to archaic, legacy systems. Seamlessness of information, non-transparency of collateral requirements, and up-to date information on inventory further compounds its efficiency/effectiveness. Valuation, as mentioned before, is a fundamental 'thorny issue' that must be addressed.

Collateral valuation/management differs from firm to firm, and the one size fits all' approach would be detrimental given the size, shape, product, geography, and operating business model of each bank. However, the most critical function ought to be the centralization of the entire process, or in some cases the fewer the silos, the better. Based on our experience working with several banks, a couple of incidents involving collateral, bears mention.

During the course of apportioning collateral between IMM eligible trades and non-IMM ones, one of the banks was awaiting the value of the collateral posted by the client. To begin investigation, the Credit Support Annexure (CSA) code was sought. The ISDA master agreement details were sourced, but the elusive CSA code was nowhere to be found. Subsequent analysis revealed the existence of the code in a legacy application long abandoned, but still part of the system, only present to house the CSA code connecting Agreement level and Legal dimension tables. A critical component such as collateral should have a better seamless flow through the application/systems to help better valuation.

In another such instance, another G-SIB bank was presented collateral Greek denominated Drachma bonds (this currency was long out of circulation). Though the specific country had adopted the euro as its currency, these bonds still had a residual value. The counterparty was an old client and in spite of reservations raised by the Credit Risk team, was accepted as a collateral but charged a hefty 40% cut. Such cases, though rare, highlights the dilemma' posed by banks treading the thin line between customer retention, counterparty credit risk, and regulatory compliance.

The above examples bolster the case for a centralized hub for all collateral related information, including all internal and external systems being in 'sync' along with appropriate triggers/alerts in threshold violations, both from an upward and downward breach. The two breaches would serve a twofold benefit – one that alerts risk managers of a potential drop in collateral value, thereby triggering margin calls or replacement of collateral and the other on collateral reuse (subject to parameters), and the transfer pricing agreements in place.

Another component worth mentioning is the IM (Initial margin) and VM (Variation Margin) agreement details to adjust amounts based on the fair value determining formulae – ISDA 1994/2002, GMRA/GMSLA/EMA agreements.

Furthermore, the models used/deployed to calculate IM are varied and come at a costs. In terms of tools/measures available for effective collateral optimization, institutional arbitrage (central counterparty/s clearing, ISDA-pioneered SIIMM, clearing strategies) against Basel proposed standardized approach methodology can also be used, but the increasing belief that firms ought to use their own internal models to arrive at the IM is gaining ground both in terms of flexibility and fine-tuning of model parameters.

Another strategy involves Internalization wherein existing collateral is utilized more efficiently; customers of the client, who might represent opposite sides of a trade – buyer and seller. Instead of using an external source to match this trade, a firm can use its internalization process to achieve this trade, thereby reducing costs and making available the reuse of the security.

Another tool available to firms includes the concept involving credit-worthiness (high) repo and reverse repo transactions called 'matched book dealing' - benefitting from the spread between the lending and borrowing rates, as applicable.

Regulatory oversight and Reporting overlaps

As mentioned above, several regulatory overlaps over the same collateral with multiple regimes, with several reports across countries. Some of them include:

OTC derivatives not cleared on CCP– EMIR - Margins on non-CCP cleared derivatives are set to increase, thus putting pressure on firms to source/demand more eligible collateral. For CCP, cleared derivatives such as CDS, IRS are subject to clearing on a staggered basis.

Collateral Haircuts – SFTR - Mandatory floors on repos, securities lending and borrowing well above the current market prices would put further pressure on banks.

Liquidity squeeze – CRR – .Transactional collateral and prudential liquidity requirements would drive banks to source and manage more collateral, further compounded by CRR mandate to ring-fence, or create a separate pool of high-quality liquid assets.

Resolution and Recovery Directives – MREL/TLAC – Banks will be pressurized to secure their positions to enable their liabilities and fall outside the ambit of `bail-in' requirements.

Reuse of Collateral – SFTR – Subject to written, legal, and binding agreements between banks and collateral providers, the reuse of pledged collateral cannot be done.

Our Approach to Collateral Optimization

Collateral Apportioning

Firms eligible for an IMM waiver have to prioritize collateral optimization with the residual amount apportioned to non IMM trades under the current exposure methodology. Collateral once identified, sourced, and bought needs to be balanced against trade exposures. Undoubtedly, lower levels of collateral would be posted as required or permitted.

However, market confidence can erode significantly in times of financial crisis or political uncertainty. Traditional valuation methodologies might not reflect the true value of a security, and bootstrapping as a proxy does not always prove correct. A highly liquid instrument might trade volatile should markets determine so. The case of the recent LIBOR manipulation case is proof of the very same participants engaging in wanton fraud and deceit.

Most of the regulations have collateral as an input for several of the reporting attributes/calculation, be it, hedge ratios, secured/unsecured transactions, pledged or third-party guarantees. Exposures, netting sets, bail-in liabilities, and the list goes on. Little surprise that collateral optimization is taking centre stage and correct valuation holds the key for a truly successful valuation.

Our belief stems from the fact that a market exists for both liquid as well as illiquid assets and liabilities. However, a key end of the bargain in this case is finding the right price and the right buyer/seller. A moot case in point is in the ` Fine Arts market' - booming by the year. Rough/unofficial estimates of the total organized, unorganized (private buyers) is in excess of USD 5 Bn and counting. It bears to mention that Art as collateral for security lending is generally not encouraged everywhere as pricing is complex, tedious, and subjective in nature.

A survey conducted by a leading Research firm

` Several banks and smaller, specialist lenders increasingly are offering loans secured by the borrower's art. A survey last year found that 40% of private banks said art-secured lending would be a strategic focus in the coming year, up from just 13% in 2012. And almost half of all art collectors service said they would be interested in such a service.

While Fine Art as collateral might seem as a ` one off incident' fuelled by a resurgent wealth class (HNWI/Ultra HNWI) it is interesting to see a sentimental value attached to something so trivial in cost – cost of canvas and the packing (frames, pedestal, attachments) would hardly be of any value However, just like a brand value of any known company the name behind the painting is priceless. Few individuals with the trappings of power and money would resist the temptation of buying a Da Vinci or Rembrandt painting (if for sale). In our earlier example of Greek currency drachma accepted as collateral, sentiments and customer relationships do trump plain old credit scoring or credit worthiness.

Valuations

Collateral valuation is the primary source of anxiety among banks. The ubiquitous M2M concept might seem a fairly simple method of valuing an asset at EOD trading horizon. Banks have been following this approach since time immemorial. However, from a fair value perspective, we beg to differ at this type of valuation. The fundamental reason is that an assets observed value at a defined horizon is erroneous and deeply flawed. To substantiate this observation consider the below example:

The open price for Boeing shares rose to USD 150 from its previous close of USD 120 reached an intraday peak of USD 190, nosedived to USD 90 and closed the day at USD 125. The product team reported the following (among others) in its trading book:

1	Product asset class: Equity
2	Product name: Google
3	Exchange: NYSE
4	Previous close: USD 120
5	Todays close: USD 125
6	Profit/Loss: USD 5 +

The above statistics might look simple, however on closer inspection, one would notice that the stock had wild swings, reaching both its intraday zenith (190) and nadir (90) before closing 5 points up from its previous close. Some might argue and explain this volatility as natural and due to several noises/events that did or did not unfold, leading to such volatile swings. The question that remains unanswered is, if the true value was indeed the closing M2M price, what explains the roller coaster ride. If, as in any free market, prices are free to rise or fall as determined by traders and/or market forces. Furthermore, the market price reflects the actual price at which an asset can be sold, whereas theoretical price is more a matter of faith which one ascribes on one's model and the other party must accept such model) and this reaction was but a natural outcome of speculation and expectation, can this be the true value at all. We believe, not. In order to arrive at the true value and not as observable ones, regulators have provided some options/methods and we agree with that approach. FASB has suggested an added approach to Valuations namely the Mark to Matrix, and the Mark to Model approaches. CCAR too joins the bandwagon with the Champion-Challenger model. The TRIM (Targeted Review of Internal Models) and the Dodd Frank Stress Test (DFAST) among a plethora of regulations vying to stay relevant amid an evolving risk landscape.

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Fair Value Hierarchy ASC 820 - US GAAP

The above articulates a categorized three level fair value hierarchy to classify investments.

ASC 830. FAIR VALUE HIERARCHY	INPUTS
Level 1 "Mark to Market"	Unadjusted quoted prices from an exchange or broker-dealer market that is considered active • Follow a consistent approach as to how the quoted price is used • Quoted prices should not be adjusted because of the size of the position relative to trading volume (i.e., blockage discount) • Bid quotes are preferred, given the exit price concept • If any significant adjustments are made to quoted prices, these become Level 2 assets
Level 2 "Mark to Model"	Observable inputs such as quoted prices for similar assets in active markets • Broker quotes - if the trade can be executed at that price • Quoted prices for identical or similar assets in inactive markets • Other observable market inputs = interest rates, yield curves, volatility factors, credit risks • Inputs derived from or corroborated by observable market data through correlation or regression analysis • For Level 2 designations, any models used must be widely accepted and non-proprietary and the data used must be observable • If any significant adjustments are made to Level 2 Inputs, they generally become Level 3 assets

Level 3 "Mark to Matrix"	Unobservable inputs • Models (e.g., Black-Scholes, discounted cash flow, multiple of earnings or EBITDA) utilizing significant inputs that are unobservable • May include publicly listed securities with very little market activity • Reflects the entity's own data about the valuation assumptions that market participants would use • Cannot ignore reasonably available information without undue cost and effort to market participants

The collateral management infrastructure is still at its infancy, with no single Industry utility or a universal CCP in place. Outsourcing of collateral management or creating/merging this function with treasury, operations, and risk systems is possible and dependent on the business model and management policy. However, creating a separate Collateral Management unit/desk under the firm wide Enterprise Risk Management framework would indeed solve the problem, notwithstanding, the cost of building one.

In reality, the collateral TOM could be closely aligned with the firms' treasury operations and aligned with its operations functions, governance risk, and compliance desk (credit, market, and liquidity risks), since CVA and DVA (XVA) pricing functions are computed here that would complete the ensemble, thereby facilitating overall balance sheet utilization.

not reside in silos, or as part of the firm operating unit level.

With increasing regulatory pressures and disruptive technology, the demand for greater liquidity firms need to respond effectively in a timely manner without endangering their financial position or be forced unto resolution as MREL/TLAC regimes come into force. A sound and central collateral optimization process would go a long way in bolstering a firm's financial resilience in times of crisis.

Conclusion

Gone are the days when collateral management was simply a back-office operational function. In its new avatar as an integral element of liquidity risk management. As banks focus to raise their returns on equity and prepare to live with a substantially reduced appetite for unsecured credit lending, there is an increasing demand for high liquid collateral for secured financing purposes.

Additionally, the need to maximize collateral value and deploy it most effectively in mitigating credit and counterparty risk exposures is paramount in any programme of capital adequacy management. As mentioned earlier on, the evolving regulatory environment will continue to place significant pressures on financial firms and create a plethora of challenges for managing and valuing collateral. With both industry and academic dissertations predicting margin call activity to increase, the availability of the supply side to meet the increasing demand for collateral will rise exponentially. This will have a bearing on both liquidity and risk management – an operational nightmare that firms need to grapple with.

Furthermore, in an environment where cost benefit reigns supreme, the industry is seeking to harness financial market infrastructure to help resolve this issue. Small and medium firms would still favor a fragmented approach in terms of outsourcing or using boutique firms, CCPs that may deliver limited operational cost and risk benefits. Bigger firms, though would move to a centralized collateral management framework. Whatever the approach, it is clear that a combination of regulatory directives, disruptive technology, and risk-reward trade-off will further drive the collateral market.

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Raji Daniel a Senior Consultant within LTIMindtree Consulting, is pursuing his doctorate in capital markets risk management. He holds a post-graduate management degree from the University of Pune. Having worked with several investment banks such as Lehman Brothers, Morgan Stanley, Knight Trading, VPS (Norway), RBS, Barclays, Nomura, UBS, Nordea, etc. Raji has been involved in business consulting within the investment banking domain in credit risk, market risk management and governance risk, and compliance. He can be reached at raji.daniel@lntinfotech.com.