The ghost of securities finance's future

Is a collateral squeeze coming? Experts discuss the possibility

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Where and how are securities finances businesses optimising their use of collateral?

Mark Trivedi: Regulations from various jurisdictions across the globe now require collateral to be posted across an ever increasing array of transaction types. This is forcing institutions to mobilise collateral within their own organisations more efficiently before going outside the organization and sourcing it externally. As a result, we are beginning to see the long-predicted breakdown of internal silos actually come to fruition.

Martin Seagroatt: Firstly, optimisation is, by its nature, very bespoke to each institution. There is no one-size-fits-all approach. The firm's trading strategy and its constraints are key components of the way the firm needs to approach the problem of optimisation.

It is important to think about this carefully before starting an optimisation project. For example, a sell-side institution's trading activities may be constrained by capital costs. It may therefore make sense to pledge out collateral assets that have a high risk weighting under Basel III in order to reduce capital consumption.

For a buy-side firm trading derivatives or servicing clients, that is short central counterparty (CCP)-eligible collateral, it makes sense to look at optimisation from the point of view of freeing up the CCP-eligible assets that it does have. This allows the firm to collateralise its hedges, while reducing the amount of cash collateral pledged out and lessening the drag on fund performance from holding large supplies of cash or low yielding bonds.

Optimising also allows the firm to minimise the use of expensive and possibly unreliable collateral transformation services.

The buy side now needs to think carefully about how it can secure stable sources of these CCP-eligible assets and match the maturity of its collateral with that of its derivatives as closely as possible. Securities finance plays an important role in all of this.

The other side of the coin is a buy-side institution that is long CCP-eligible assets, for example, a sovereign wealth fund. For this firm, optimisation could look at identifying surplus assets to lend out once it has met its own collateral needs.

The Basel III liquidity coverage ratio (LCR) is also one of the main concerns coming up for banks and will be a large driver of the demand for high-quality liquid assets, starting in January 2015. This is very much an optimisation problem.

It makes sense to prioritise the LCR as the de-facto 'hardest to please' counterparty. The optimisation algorithm must be able to identify collateral assets that are eligible for the LCR and allocate assets to it before satisfying other market counterparties.

As the list of LCR-eligible international securities identification numbers changes frequently, this requires data feeds with regular updates to ensure the LCR pool remains compliant. This is a large headache for banks and something they need to start working on immediately, as the compliance deadline is not far off.

Many of our clients are therefore now starting to organise their securities financing and collateral desks around bringing in LCR-eligible assets. It makes sense to utilise internal inventory or to structure the natural flow of assets from securities finance activities to bring in LCR collateral rather than going to the street to source.

As always, this comes back to the fundamental basic starting point of optimisation; a single consolidated view of collateral inventory across the firm's business lines and geographical locations.

Finally, there is also a lot of work going on around the infrastructure required to move collateral around. While there is enough collateral to prevent a collateral crunch, the main challenge for firms is to mobilise it and move it to the right place, at the right time.

Optimisation is largely about intelligent placement of collateral. However, a large part of effective collateral use revolves around automating the process of mobilising collateral, both within the firm and across the market infrastructure or collateral 'plumbing'.

Initiatives such as TARGET2-Securities (T2S) should help with this. For this reason, firms need to make sure they have the technology in place to move collateral at high velocity with a minimal amount of manual processing and operational risk to support these improvements in market infrastructure.

Jeannine Lehman: Before we can talk about optimisation we have to consider aggregation and reporting on collateral at the holistic firm level. In some cases, we see the market moving securities financing desks up a level to create central 'collateral treasuries' that look at the overall collateral needs of the firm. The combined view then allows desks to optimise the wider pool of assets for financing and perhaps direct exposure coverage needs, leveraging the tools they have available to them, such as BNY Mellon's triparty collateral platform.

We certainly see this as a global change for broker-dealers, and have started to see the larger buy-side firms also entering this space, looking for a collateral agent that can help them finance but more broadly, allocate and process collateral in a number of ways.

Jerry Friedhoff: Securities finance desks have traditionally looked at collateral optimisation as part of their daily financing activity. Whether trading in the specials market on an individual security basis or sweeping general collateral pools into best fit triparty shells, financing desks utilise optimisation techniques to source the cheapest-to-deliver outlets for financing both firm and customer assets.

Moving forward, these desks will continue to fine tune their optimisation techniques in support of the anticipated increased collateral demands associated with regulatory change, deliver more effective collateral cost allocation models to their trading desks and seek out areas of opportunity with regards to collateral transformation.

Saheed Awan: At our recent collateral conference in Brussels this May, this was a well-debated theme. A large consensus felt that more needs to be done to unlock silos of assets, across geographical locations, in a seamless and efficient manner. Many agreed that collateral velocity, ie, the speed and re-usage possibilities for collateral, are to increase significantly in the post-regulatory business domain.

One area of immediate optimisation that firms are encouraging is the use of third-party collateral management agents.

Elaine MacAllan: The huge amount of cash still being used as collateral (global estimates range from 70 to 85 percent of all collateral posted is cash) shows that while optimisation has been the industry buzz-word for some time, and appears in most firms top three strategic priorities, in reality it is still in it's infancy in terms of market implementation.

Various optimisation methods are being considered while firms get to grips with how to deal with the both the intended and unintended consequences of regulatory reforms on global collateral management practices. These can be broadly categorised, but in reality firms are considering a combination of internal solutions, outsourcing services and vendor technology solutions.

Large firms are quickly establishing collateral optimisation programmes, and smaller institutions are watching with interest, ready to learn from their successes and mistakes. Ultimate responsibility for collateral is moving to the front office, but the operational processes needed to support effective collateral management are remaining in the back office—so a new dynamic is appearing. There is a noticeable scramble to create optimisation solutions from both a calculation and technical perspective. The realisation of the complexity involved is forcing many firms to turn to vendor solutions.

Vendors tend to be able to develop and deliver technology solutions faster than in-house teams, and offer functional roadmaps to support optimisation programmes as they expand and mature. Early adopters are wisely putting a focus on maximising asset availability and access to quality data. Unless you can hold and apply accurate agreement, asset, cost and eligibility data, and establish a firm-wide view of inventory, the quality of the resulting solution will be compromised. Some vendor solutions impose optimisation calculations, in an attempt to identify universal 'cheapest to deliver'.

We see this as a risky strategy with a short shelf-life—what is cheapest to one firm will not be for another as different proprietary cost models play an important part. Any vendor solution offering longevity must provide configuration and data flexibility, whilst empowering users to define and adapt their own definition of 'optimal'.

Firms are also turning to triparty services or outsourcing providers as a quick way to optimise their use of available collateral assets. This is an effective method, but can be costly, with the drawback that firms often do not internally have either the process capability or technical solutions to validate the optimisation or justify the cost/benefits.

Robert Almanas: With the inception, under the European Market Infrastructure Regulation (EMIR), of mandatory clearing for OTC derivatives in Europe early next year, demand for collateral across the financial industry, and particularly within securities finance businesses, is becoming substantial. This is because of its role as a "modern money creation process" (as the Bank of England described it).

Estimates of the collateral required still vary but it is clear that buy-side firms are under pressure to optimise their use of collateral. Therefore, firms across the value chain are working with global custodian banks as well as post-trade service providers such as SIX Securities Services to prepare for the regulatory changes. One key challenge they face as they plan how they will manage their collateral and where they will need to pledge cash or assets for multiple collateral calls in the future, is the fragmented and inaccessible nature of their collateral. As such, mobilisation of collateral is a key concern.

This fragmentation has been making it extremely difficult for market participants to access and understand their collateral efficiently, and continues to demonstrate the need for effective mobilisation tools to support collateral management efforts.

Ted Allen: We see a consistent trend in the market for consolidation of collateral management functions across silos, and securities finance is one of the silos affected. The driver is regulation and resultant increase in capital and collateral requirements. Most firms now recognise the need for a holistic view of the inventory of assets available for deployment over and above the silo level. This holistic inventory is the first step to achieving collateral optimisation. It is only if you can see the whole picture that you can make the strategic decisions about how to allocate your collateral.

One important aspect in the optimisation question is that each firm has different views of what is optimal. This means that they need flexible tools that can be easily configured to meet their business priorities and economic outlook. Specifically in the securities finance space, there are some clients that use have historically used triparty agents for collateral optimisation. However, increasingly they view the rather simplistic approach taken as inadequate and potentially inefficient. More and more firms want to use optimisation techniques that reflect their business rules.

How do you do it in your own business—and why do you do it that way? If you're a vendor, how is the best you've seen it done, and why?

Awan: As an industry collateral management utility, we play a specific role. We are constantly evolving our service offer to meet the needs of our 1500 clients from around the world. Our collateral management business is about building an infrastructure for mobilising and allocating collateral globally.

Our priorities in collateral management are primarily to grow the connectivity that we have on the Collateral Highway, in terms of both sourcing and delivering both bonds and equities from around the world on behalf of our clients. Equally, we have to be able to allocate such securities collateral to an ever-expanding ecosystem of collateral receivers, liquidity providers and risk mitigators. They are exit or delivery points on the Collateral Highway.

In practice, the targets and markets segments are tightly focused, particularly on central banks as one of the key exit points for collateral and for providers of liquidity. However, we also connect with all the world's principal CCPs. Our day-to-day business involves bringing more liquidity providers and CSA counterparts onto the Highway, whether they are corporate cash providers, insurance companies, securities lenders or commercial banks.

Almanas: At SIX Securities Services, we are progressively deploying a collateral management service that will provide our clients with access to a pool of collateral, reaching across markets, currencies and time zones, which mobilises their collateral.

Crucially, once rolled out, this will enable clients to have a consolidated view of their collateral across multiple infrastructures, and will instruct collateral movements accordingly between locations. This is important, as collateral held in a final place of settlement or central securities depository (CSD) is far more likely to be fragmented across markets. Even though these locations are extremely safe places to hold assets, many clients understandably don't want to risk holding all of their collateral in one place.

Allen: An interesting case study for this question relates to one of our clients that has taken a holistic approach to collateral optimisation and liquidity management. Using a single linear optimisation run, we are able to help them minimise the cost of the collateral required to support their trading activity across all of their counterparties and at the same time, maximise the second line of liquidity left available to them after these assets are deployed. This kind of advanced analysis using a sophisticated and flexible vendor tool translates into substantial and measurable cost benefits.

Trivedi: J.P. Morgan has been a collateral agent for more than four decades. In our role as a global agent, we help clients have a better view of their balance sheets across business lines, linking them to additional sources of demand/liquidity such as OTC derivatives clearinghouses and affiliated lending programmes. We provide clients with sophisticated algorithms that help optimise their collateral allocation decisions.

We believe the best approach to efficiently optimising collateral requires holistic/timely data that's organised in a manner that allows the institution to apply economic logic integrated with settlements infrastructure. Given the complexity of the data and processing requirements, a robust technology infrastructure is mandatory. J.P. Morgan's focus is on providing an integrated set of tools, technology and services to our clients.

Seagroatt: We find the firms that are ahead of the curve have completed the initial steps of consolidating inventory and exposures and mapping reference data. From there, they are pledging basic 'cheapest to deliver' assets to meet individual margin calls and in some cases, making cheapest to deliver substitutions and reallocations. The vast majority of market participants are either at this stage, actively implementing it, or thinking about it.

The most forward-thinking firms, which are even further ahead, are responding to the cost pressures facing the industry by arriving at a much more fine-grained transaction cost analysis. This involves funds transfer pricing, collateral opportunity costs, and streamlining which counterparties the firm trades with based on the profit and loss per unit of capital consumed, balance sheet usage, netting benefits and collateral costs. They are using big data analytics tools to perform complex multi-factor optimisation runs.

The industry is becoming more commoditised and industrialised. Banks now need to make tough decisions around which business lines and geographical markets to remain in. It is impossible to do this without an accurate view profit and loss for a given trading strategy or business unit.

The firms that will come out of all this in a strong competitive position will be those that can consolidate accurate data to support decision-making using a holistic approach to optimisation, taking into account all of the constraints imposed by the new regulatory environment.

Friedhoff: Optimisation techniques are not 'one size fits all'. These techniques remain tailored to an individual firm's own collateral pools across both cash and securities. Current technology solutions have focused on more refined inventory management criteria that bring individual product silos into a more holistic view while supporting optimisation benefits via a series of choice algorithms.

MacAllan: We think the best solution is a rules-based approach that allows users to configure their own definition(s) of 'optimal' and run algorithmic optimisation calculations on a real-time basis to identify the 'best' assets to be used 'now', reflecting individual and changing priorities. An optimisation solution should be adaptable and extendable to also consider future asset needs and optimisations. In this way the technology should enable an institution to identify their preferred allocations for use within principal bilateral and cleared margin obligations, but should also enable service providers and asset managers to provide bespoke optimisation services for their clients.

Alongside configuration, the best optimisation solution enables an enterprise view of collateral availability. After all, if you can only consider a portion of available assets, your calculation results won't be truly optimal. An enterprise inventory manager should be capable of providing a real-time view of all asset positions and values, of any asset type, and from any source. This may include external availabilities—it may be more optimal to consider a wider asset pool than only internal sources. Unless the inventory and optimisation engine can access and consider this data, the optimisation result will be compromised.

Lastly, the best optimisation solution will be able to consider cost as an element in the calculation, but that cost value must be configurable or provide plug-in capabilities—any solution that imposes a cost or value calculation on the user will ultimately fail. Large institutions in particular want to use their own proprietary cost models in the optimisation calculations.

The ghost of securities finance's future, a collateral squeeze, is always there—what are you seeing right now, in the current regulatory environment? Vendors, how are your securities finance clients reacting to the prospect of having to scramble for collateral? Are they panicking, or is it all in someone's head?

Lehman: The so-called collateral squeeze/shortfall/'sky-is-falling' scenario is yet to materialise—and nor do we expect it. At the moment, we don't see a great panic for better quality collateral. Our securities finance clients have implemented measures within their own firms to manage new regulatory requirements and are efficiently financing where they need to and at levels that are not outlandish. Upgrade trades are facilitating the use of equities as collateral and allowing brokers to source in higher quality inventory for their clients. So for now, and in the near future, we believe things are under control.

Having said that, many of the new regulations—Solvency II, Basel III, EMIR, central clearing—have yet to really bite. Our sense is that there is still a widespread 'when it hits', 'wait and see' mentality. These regulations will cascade through many levels across the global markets, and it is only when market participants experience first-hand the likely pain coming their way that we can really start to gauge the true impact on collateral.

MacAllan: The anticipated collateral squeeze is a dawning reality, however, optimisation processes are beginning to emerge, as firms seek new ways to better manage risk and collateral assets in response. A single point-in-time crunch is looking unlikely, as long as firms find and adapt solutions and maintain a pace of technology and process change in time to react to the market impacts of regulatory reform. Doing nothing may be a risky strategy.

It is widely accepted that increasing margin obligations imposed under new terms (mandated clearing, gross investment management, obligatory investment management, etc) will mean that global collateral requirements will vastly increase, though estimates vary as to the final impact as the regulations roll out over the coming few years. It certainly isn't all in someone's head.

Panic levels are rising as regulatory deadlines approach, although are broadly in line with dawning deadlines. Those with more distant deadlines are less worried and adopting a 'wait and see' approach to see how the early adopters fare in the new environment.

We are seeing a number of reactions to the anticipated collateral squeeze:

- A review and renegotiation of agreements—widening of asset acceptability;
- Creation of optimisation functions;
- Assessments of alternative collateral sources and analysis of cost implications; and
- Business moving to alternative product lines that are less collateral greedy.

Of course, others are turning this challenge into a business opportunity to create and provide entirely new frameworks that deal with the complexities and demands of the collateralised securities financing business. Service providers are beginning to inter-operate and integrate to offer front-to-back execution, settlement, calculation, collateralisation, transformation, optimisation and asset protection services.

Almanas: In a major change to common opinion last year, the consensus among most market participants today is that we do now have enough collateral in the system to meet these heightened requirements. Unfortunately, it is also agreed that the collateral required is currently both inaccessible and fragmented in a number of collateral pools, locked away in different geographic locations, time zones and entities.

Rather than solving this problem by diluting the notion of what constitutes acceptable collateral, securities service providers are in a unique position to support effective collateral management by providing firms with access to these pools, freeing up much needed liquidity in the market. Through the creation of a virtual collateral pool spanning the markets, these providers can enable collateral to be valued across multiple time zones, systems and currencies, helping to eliminate the inefficiencies inherent in having to transfer securities through these systems.

As a securities service provider, we are working hard to ensure the flow of collateral is as fluid as possible across the markets. While it is key that collateral be high-quality, liquid and simple to drive this, effective mobilisation will be integral in making this happen.

Awan: Again, feedback from our collateral conference showed that clients, and their balance sheets, are coming under increased pressures as a direct result of the pending regulatory environment. But it depends from what angle you are approaching and where your organisation sits in the secured financing domain. For example, for the securities lending segment, the US Dodd-Frank Act, EMIR and Basel III could very well lead to beneficial owners lending their securities. I'd say that 'panic' is the wrong word. More relevant is the lack of education at the buy side in terms of what is ahead. There is still a concerted effort needed by global custodians to educate their buy-side clients.

Mandatory clearing is a huge headache for the buy side. Insurance companies (solid insurance companies) that previously never had encountered such problems, are now being lumped in the same bucket as highly-leveraged hedge funds. They naturally ask: why are we paying the price for having to put up initial margins where we didn't have to do it before? They all lived off variation margin until now and now also initial margin, which is not low, but more like 10 or 12 percent depending on the time left to maturity of, for example, a gilt. Then, these buy-side firms have to set up new processes to manage their margin calls.

Add these together and you can see why it is a nightmare. We are talking to one of these Scottish insurance companies and they say they remain concerned about the implications around the level of margin calls that are expected, post regulation, when mandatory clearing is in place in Europe.

Allen: We are seeing the market adapt to the reality of the liquidity impact of the increase in collateral requirements through the deployment of collateral optimisation techniques. More sophisticated tools will identify opportunities for collateral upgrade trades that may lower the overall cost of collateral. We are also seeing a loosening of collateral eligibility rules in some cases (for example Eurex now accepting equities) and the joined up offerings from the CSDs are an interesting play on the problem.

Overall, our view is that the market is adjusting and that improvements in infrastructure, automation and the optimisation tools available to firms mean that collateral velocity is increasing. It will be interesting to see how this plays out when the Basel Committee on Banking Supervision/International Organization of Securities Commissions rules start to affect participants in the bilateral OTC derivatives market from 2015 with the requirement for greater amounts of collateral and significantly for the restrictions on rehypothecation.

Trivedi: We have seen a varied client reaction to increased collateral requirements, largely related to the industry and level of sophistication prior to these regulatory changes. In general, our clients don't view there being a shortage of collateral.

However, in many cases the assets simply are not available to the relevant entities with increased collateral obligations. Acquiring those assets may affect their underlying businesses given financing costs and balance sheet pressures. Many firms have found tactical means to cope with these changes but do realise these mechanisms may not be sufficiently scalable or economically efficient.

Metaphorically, we're only a few miles into the marathon. Scalability and efficiency will only continue to become more important as pressures on acceptable collateral increase: eg, EMIR's implementation, a continually evolving regulatory landscape, eligibility requirements becoming more proscriptive, more transactions requiring collateral, and longer-dated or grandfathered contracts expiring, among others.

Friedhoff: There has been a tremendous amount of discussion on the potential collateral squeeze associated with regulatory change to date. The consensus seems to be that the demand for high-quality collateral—the frequency and amount of margin call activity—will only increase in the coming years. Firms remain focused on the potential costs (collateral, capital) and benefits (optimisation, transformation) associated with ongoing regulatory change as they position themselves for the future. We are seeing that collateral management can be additive and have a real impact on the bottom line when incorporated in an effective way.

Seagroatt: We aren't really seeing a scramble or panic as such, although interest in optimisation tools has surged in the past year. But the demand for larger amounts of collateral will really start to take effect in 2015 when trading via CCPs in Europe begins, bilateral margin standards come into play and Basel III starts to bite.

However, rather than posing an existential threat to securities finance, a collateral crunch could actually benefit the business. If collateral is the lubricant to the financial system, then the securities finance markets are the plumbing.

It is essential that this 'plumbing' works efficiently to ensure that the financial system remains resilient to stress in a future crisis. Regulators seem to understand this on the whole. There is a real danger though that the combined impact of the various regulatory streams creates unintended consequences that cause blockages in the system.

From a supply and demand point of view, any major increase in the cost of collateral should provide an incentive for holders of supply to lend it out. This would unlock a lot of the collateral currently sitting idle in the system.

Central banks will presumably also be ready to fine-tune the impact of new collateral demands by adding liquidity if necessary, acting as the collateral transformers of last resort. So my personal view is there won't be a collateral crisis as such, it will be more of a market adjustment.

Trivedi: We see clients viewing collateral as an asset unto itself. Increasingly, their focus is on managing that collateral in accordance with economic decisions, in parallel with financing decisions, to fully utilize all available assets.

Are new asset classes opening up to meet increasing demand for new types of collateral? If so, what and why? If you're a vendor, how are you connecting borrowers and lenders with new asset classes, if they are demanding any at all?

Allen: Although the logical assumption when hearing of a collateral squeeze might be that lenders are opening up their collateral acceptability schedules, we are not seeing a great deal of evidence for this. What we are seeing, however, is greater emphasis on firms being able to maximise the use of their available inventory (for example, equities) in order to transform them into the type of high-quality liquid assets that are most commonly accepted as collateral by CCPs.

Awan: It is a correct assumption that demand for high-grade collateral is increasing. But it is incorrect to draw the conclusion that there is a collateral shortage. Industry observers would say that the forecast of new collateral required as a result of Dodd-Frank, EMIR and Basel III is somewhere between \$3.5 and \$6 trillion. That's the demand side.

The supply side is, in theory, less worrying. The International Monetary Fund reported in early 2013, that there is around \$44 trillion from the G20 of sovereign debt, of which \$33 trillion is governmental debt from OECD members. Then there is also about \$2.5 to \$3 trillion held in lending pools.

Markit Securities Finance says it reports on some \$14 trillion in securities lending programmes, of which about a third, or certainly a quarter, is in high quality liquid assets. Then there is ourselves and the other three large triparty service providers, which account for roughly \$950 billion to \$1.2 trillion of cash available from the repo market. Repo is considered a collateral upgrade trade in that sense. So there is, on paper, sufficient ample supply.

And indeed, there is a growing appetite for different types of assets as eligible collateral as the markets recover from the global financial crisis. At Euroclear, we are noticing a trend for more of our clients to accept equities as collateral, especially major index equities.

MacAllan: Certainly one of the market responses to the collateral squeeze is that agreement terms are being closely reviewed—in particular those agreements that have very tightly defined eligibility criteria—triparty, lending, clearing agreements, etc. Clearinghouses are continually looking to widen collateral acceptability criteria, although new asset types tend to attract higher haircuts and so the optimisation programme/calculation must be able to consider the final haircut cost of using the collateral asset according to the posted venue.

Bilateral agreements are also being scrutinised—many older agreements may not have eligibility criteria clearly defined—collateral acceptability may be documented as 'like for like' (difficult to define in a diverse portfolio that is margined on a net basis) or 'as agreed between the parties' (difficult to impose and historically negotiated precedent plays a significant part here).

For many institutions it is often the case that although their documented terms allow them to use a wide asset selection (including equities, commodities, low-rated sovereigns and corporate assets, etc) they are technically incapable of automatically validating eligibilities/concentration limits/haircuts within the asset booking process, so they fall back on using high quality, universally eligible assets, even though they are not optimal and may be costly.

In order to support an efficient optimisation process, technology is required to both hold complex collateral acceptance criteria, and to utilise these terms in the calculation of 'optimal'.

From a vendor technology perspective, COLLINE enables a significant improvement of the collateral allocation and optimisation process. It can consider the enterprise inventory of assets, and support a rules-based calculation of the best assets to use from a cost/availability perspective, always consistent with the documented eligibility and concentration criteria. If the asset pool available widens (eg, if externally available assets are fed into the platform) COLLINE can simulate a sweep of existing allocations to identify potential substitution opportunities to improve the overall allocations at enterprise level and reduce the cost of the collateral programme.

In order to do this the platform enables configuration and mapping of the following data elements, for use within the real-time optimisation calculation, so meeting the needs of both lenders and borrowers, and sell- and buy-side users:

- Exposures/margin requirements;
- Inventory, including segregation and rehypothecation constraints;
- Agreement terms, such as eligibilities, concentration limits and haircuts;
- Asset data; and
- Market data.

Lehman: We haven't yet seen the predicted collateral squeeze, but there has nonetheless been an increased appetite for looking at a wider set of collateral types. There is no increased demand for collateral per se, rather counterparties are simply looking to optimise the collateral they already have at their disposal, rather than looking to transform it.

At present there is a big focus on exploring the feasibility of adding new collateral types and assessing the number of participants that might wish to utilise them. The key here is to ensure that those new types of collateral are being extended in line with current and emerging demand—there is no point increasing your pool of a particular collateral type that you already hold in abundance if no one else wants or needs it.

Friedhoff: The securities industry continues to lobby CCPs to accept additional collateral types in support of margin obligations. As the migration continues from a bilateral to cleared trade environment, the increased collateral disparity from one exchange to the other will only heighten the need for pre-trade tools that offer best execution technology to support these demands. Our focus, from a technology standpoint, will be to create these seamless integration points across our securities finance and collateral management product suites for our clients.

Seagroatt: There is no real evidence of a move from cash collateral to non-cash yet. In the current low interest rate environment, the system is awash with cash and there are lower incentives for the market to move to non-cash collateral.

However, as central banks taper quantitative easing and mop up excess liquidity, we should see the supply of high quality government debt come back into the market. CCP collateral eligibility schedules also accept a reasonably wide range of asset classes, although these are subject to concentration limits.

The use of non-cash collateral therefore presents a huge opportunity for market participants, particularly derivatives end-users on the buy side that want to maintain asset allocation strategies rather than hold large amounts of cash for margin. Managing non-cash collateral does add complexity though and this is where technology solutions add a lot of value. Many firms previously using spreadsheets for collateral management will find that they are no longer sufficient.

Almanas: With regulators increasingly viewing mandatory clearing and enhanced collateral requirements as effective risk management tools, the next asset class to be impacted will be OTC derivatives in Europe early next year. In addition, from December 2016 uncleared trades will also start to require collateralisation.

Adding to these collateral woes, the so-called 'killer clause' 47.3 of EMIR states that the billions in collateral being held by clearinghouses for initial margin calls must be locked up in securities settlement systems, to ensure adequate protection. Once instigated, this will mean that the market will require its full draw of collateral—currently estimated at a staggering €11 trillion. To meet the demands of this pending collateral lock-down, a fundamental shift in the market's current collateral infrastructure is therefore required.

Trivedi: We see clients viewing collateral as an asset unto itself. Increasingly, their focus is on managing that collateral in accordance with economic decisions, in parallel with financing decisions, to fully utilise all available assets.

What is needed technologically to optimise collateral use within securities finance businesses in the current regulatory environment, and how can technology be upgraded for future upheaval?

Trivedi: Efficiently optimising collateral demands a holistic approach. Optimisation requires a complex technological infrastructure that supports the aggregation, view and analysis of obligations with sophisticated tools to mobilise collateral across the franchise. You need comprehensive and timely data, the ability to apply economic logic and the means to integrate with the settlements infrastructure. J.P. Morgan provides all these components as part of an end-to-end service that supports our clients in managing collateral as an asset and making economically-impactful decisions.

Allen: Collateral optimisation is the key driver for change in the collateral management infrastructure within many institutions. To minimise the cost of doing business and to overcome the shortage of collateral, it is paramount to optimally allocate the assets available within the firm to meet the firm-wide requirements. To find the best allocation of inventory across requirements you must satisfy all of the requirements in a single allocation step.

Collateral optimisation is not merely a cheapest to deliver view for each collateral requirement in turn. What is needed is to deploy numerical optimisation techniques to determine true optimal allocation considering all requirements and their constraints of eligibility, haircuts etc. in a single calculation. This is a complex problem that requires specialist technology. The second aspect is one of scale. Collateral optimisation increases the velocity of collateral movements and to avoid strain on infrastructure, it must be accompanied by automation in the allocation and booking process.

MacAllan: This in large part depends on the existing technical infrastructure—firms face various technical hurdles in the implementation of an optimisation programme—not least access to, and normalisation of quality data.

As an ultimate goal, firms need to be able to access and process data in a real-time and global environment. Optimisation results can only be as accurate as the quality of data available.

There are two main elements to this challenge: Quality of data—real-time, global, cross-product and enterprise-wide;

- Quality of function—technical flexibility, user-configuration and extendable functionality capable of consuming and applying the data;
- In terms of technical upgrade requirements to implement a fully functioning optimisation process, a firm needs to access or provide the data elements outlined above—exposure, inventory, eligibility, market and asset, including costs and any proprietary cost models.

It is often the case that existing technologies fall short and that vendor solutions are required to support these features. There are three broad technical upgrade options that can be considered:

- Full cross-product implementation onto a single platform: some firms focus on rolling out a strategic replacement of existing legacy systems, silos, functions and processes that are no longer fit for purpose and do not meet either their corporate goals or regulatory obligations. This is the fastest way to implement true cross-product optimisation and centralised inventory management. Successful technical integration is key here, and so therefore is a dedicated and capable team.
- Gradual modular implementation: some firms are strategically focused on single platform, but do not have the appetite for a 'big bang' approach for integration and implementation—they may prefer a more phased approach, existing software licences have some time to expire but do not offer the enhanced functionality required, or the complexities involved in re-structuring the existing architecture encourage a more prudent step-by-step approach. The benefit of this approach is that gradual change is often more palatable, and implementation can be more tightly controlled. However, it will take longer to achieve the ultimate benefits offered by an enterprise optimisation function.
- Integrate enhanced modules with existing infrastructure: there is also a demand for optimisation and inventory technology as a standalone platform, capable of direct integration with multiple technologies within the existing infrastructure, and dealing with the complexities of data formats and transfer mechanisms that are inevitably involved. The standalone platform must be able to 'normalise' the data from disparate systems, in order to properly assess 'optimal' according to individual data models. The benefit of the standalone solution is that it is independent and can sit on top of the firm's existing infrastructure. The disadvantage is that the solution can only be as successful as the constituent data elements or framework.

Seagroatt: The basic component of optimisation is establishing a single global view of inventory and exposures across the firm. This is a fairly complex undertaking for most financial institutions. However, it offers a good return on investment.

Another key starting point is accurate mapping of eligibility, concentration and haircut schedules. Furthermore, technology solutions now need to incorporate collateral costs, risk-weighted assets and liquidity coverage ratios to support effective optimisation. All of this data is changing on a daily or even intraday basis. This means systems need to consume and process this data in real time with minimal manual intervention.

Collateral management solutions must also be able to move collateral efficiently in an automated way. This includes the ability to instruct movements in multiple formats to deliver collateral into the correct depositories. The number of collateral movements will increase dramatically in the coming years so maintaining control of settlement costs and mitigating operational risk is going to be a big challenge.

Finally, systems must support new services such as collateral transformation and offer tools that can help to price these services, based on factors such their balance sheet consumption.

While it is possible to use multiple technology solutions for all of this, a single system approach makes sense. There are major benefits in seeing all of this data in one place, from front to back office and across the firm's business lines.

A phased approach to optimisation is often best. Once basic optimisation is in place, the firm can assess the cost/benefit trade off from implementing more advanced techniques that require greater investment.

We will continue to see a lot of innovation in the collateral space in response to the upheaval facing the industry over the coming years. As hardware and processing costs come down, the more advanced techniques should also become available for a wider range of market participants. **SLT**