The XVA state of play: Its transformative impacts

numerix

When numbers matter

Discussions about XVAs half a decade ago were nothing like they are today. Financial industry practitioners are paying a lot more attention to the pricing, valuation and risk management of their derivatives transactions. New regulations and the emergence of new XVAs, such as KVA and MVA, are requiring enhanced governance and more powerful computational capabilities. They are also requiring a change in market practices. For example, when it comes to valuations, banks can no longer ignore the impacts of counterparty credit risk, funding and regulatory capital.

On May 22, 2019, Numerix hosted a webinar, Taking XVAs to the Next Level: Technology and XVAs State of Play, that featured market experts including Audrey Constabile Blater, Senior Analyst, and Paul Sinthunont, Analyst, both from the Aite Group, a global research and advisory firm for the financial services industry, as well as Irina Slobodyanyuk, a Risk Product Specialist at Numerix. They participated in discussions regarding a range of XVA topics, including the evolving use of valuation adjustments, the challenges herein, the structure of XVA desks, and other themes.

The webinar also revealed some of the findings of an XVA study, XVA in 2019: Valuations' Generation X, the Aite Group conducted based on conversations with heads or members of XVA trading desks, as well as with pricing and risk management functions at regional and global banks.

Growing Role XVAs Play in the Market

A common theme that emerged among the discussions was that XVAs are playing an increasingly larger role in today's market, in the sense that there is a greater adoption of more types of XVAs. The reasons vary. For Irina Slobodyanyuk, it simply comes down to what it takes to successfully run a derivatives business today. "In the current market, banks have no other choice but to achieve accurate prices and to mitigate risks, and to know the correct amount of transactional costs to pass on to counterparties," she says. "Also, while market participants are still concerned about obtaining competitive pricing, it is becoming clear that accounting and price are no longer the only driving forces to adopting the valuation adjustments. Now with initial margin requirements and changing capital requirements due to regulatory changes, we see other XVAs coming into play and thus the role of XVAs is expanding in the marketplace."

"I think that the improving technology toolsets that are being made available to manage the variety of XVAs are helping to push banks towards the greater adoption of them."

— Paul Sinthunont, Aite Group

Audrey Constabile Blater adds, "While accounting requirements initially drove banks to calculate CVA (Credit Valuation Adjustment), we are finding that today the main use case for valuation adjustments has become more focused on risk-adjusted pricing and taking into account the costs of operating a trading desk. Because of this shift, we are seeing more flavors of XVAs being calculated. For example, we now see FVA (Funding Valuation Adjustment), MVA (Margin Valuation Adjustment) and KVA (Capital Valuation Adjustment) becoming more mainstream."

Technology is also a driver of growing XVA use. Paul Sinthunont comments, "In addition to the regulatory environment, I think that the improving technology toolsets that are being made available to manage the variety of XVAs are helping to push banks towards the greater adoption of them." He also credits expanded usage across the XVA family to a desire for firms to keep up with industry best practices. "Many banks we spoke to as part of the Aite study talked about what their peers are doing in terms of industry best practices and the need to keep up with them," he says. "No bank wants to get singled out by a regulator or get caught in something in such a way that it may cause reputational damage."

Blater adds, "When you bring industry best practices into the equation, you see market participants start to bump up what they're doing with XVAs. That's a great development."

Going back to Slobodyanyuk's and Blater's points regarding the rise of a new generation of XVAs, such as KVA and MVA, regulations, of course, are the key force behind them. If we think of an XVA timeline, CVA and DVA (Debt Valuation Adjustment) came about first, soon after the turn of the century (2002 and 2003, respectively). It is important to note, though, that while the theories behind CVA and DVA existed before the financial crisis, they were not necessarily defined as CVA or DVA and were known only to a small group of the largest banks, and each addressed them differently or not at all. The post-crisis crackdown on derivatives and counterparty risk is what placed CVA and DVA center stage.

Regulations that drove collateralization led to ColVA (Collateral Value Adjustment) being introduced in 2010 and then FVA in 2011. After that, we saw KVA and MVA come into the foreground in 2015 as a result of capital being explicitly defined and by the onset of initial margin rules.

In terms of what is happening today regarding the impact of the regulatory environment on XVAs, Slobodyanyuk notes, "The most impactful changes to XVAs are being caused by shifts in regulatory requirements imposed on market participants, and currently these requirements are primarily hitting MVA and KVA. With MVA, initial margin requirements are becoming stricter every year and will do so until 2021, when most of the market will have to post initial margin." As for KVA, Slobodyanyuk says, "From the KVA point of view, going forward the discussion will shift to new emerging capital measures. For instance, under the updated Basel 3 Capital Requirements, capital measures now have to be calculated on XVA sensitivities."

"The most impactful changes to XVAs are being caused by shifts in regulatory requirements imposed on market participants, and currently these requirements are primarily hitting MVA and KVA."

— Irina Slobodyanyuk, Numerix

Aite Group breaks down XVA approaches into two segments, an active approach and a passive approach.

ACTIVE APPROACH	PASSIVE APPROACH
• Central resource management (XVA desk)	• No centralized approach
• Map to "illiquid"credit spreads	• Illiquid credit risk still dealt within real world
• Active and consistent management of CVA, FVA, MVA, etc.	•No active management
• Lower capital charges (SA-CVA and maybe IMM) • Capital relief from hedges	• Higher capital charges (SA-CCR and BA-CVA) • No capital relief (hedges may use capital)
• Long-term view on return on capital (KVA) vs. P&L	• P&L centric
• Correct and consistent pricing and valuation (novations, restructurings, backloading, etc.)	• Potential for inconsistency as XVA is not dealt with hollistically
• Optimizes around initial margin, capital, P&L, etc.	• Struggles to define what is optimal
• Active derivatives player	• Only trades derivatives where critical

Challenges Linked to XVAs

While the capital markets have, generally speaking, over a decade of experiencing utilizing and managing XVAs, and with much progress being made in the practice of doing so, substantial challenges still remain that are linked to XVAs—and they are complex.

To Slobodyanyuk, two factors come to mind: data and compute power. "Implementing XVAs always comes with some sort of data issue in one form or another," she says. "We need data to run the calculations for the XVA measures. But as all market participants know, gathering

market data across an organization is always a challenge, as data is pulled from multiple sources, which often means multiple teams having to work together. It's also a complex and time-consuming exercise as it is difficult to consolidate all the needed information in order to have a valid XVA system in an organization."

Once the data is obtained, next comes the computation of the XVA measures, which requires significant compute power. As Slobodyanyuk explains, "Since a firm will be manipulating an immense amount of data to conduct the computations, it needs hardware with a large amount of computing power. This is particularly the case for the newer XVA measures because they are so complex. For example, we need to project VaR measures for MVA, which is done in two dimensions—we are conducting a stochastic simulation, so we're talking about multiple paths, and we are also simulating these measures for the time of the transaction."

Blater agrees that data is a top-of-mind concern. "Banks mention that they have challenges integrating data for netting and collateral agreements. So, the better integration of information should be a top-of-the-list action item for banks looking to elevate their XVA practices," she says.

Regulatory issues are also high on the list of XVA-related challenges. Blater notes, "Unclear regulations and inconsistent rules have definitely raised eyebrows. Uncertainty in regulations due to frequent revisions in methodologies are pain points. For instance, the final Basel III rules for market risk capital (FRTB-CVA) are still murky given the lack of clarity concerning the exact formulas for CVA."

Slobodyanyuk adds, "As I mentioned earlier, the latest update of Basel III outlines that capital must be computed using XVA sensitivities. In the regulatory capital calculation, the XVA sensitivities must be computed on the underlying risk factors and then aggregated into a single value based on their prescribed formulas. This is a very complex calculation, and the hardware infrastructure needed to calculate this is considerable."

"Banks mention that they have challenges integrating data for netting and collateral agreements. So, the better integration of information should be a top-of-the-list action item for banks looking to elevate their XVA practices."

— Audrey Constabile Blater, Aite Group

Using Managed Services to Meet Hardware Requirements

One solution to meeting hardware requirements is adopting a managed services program, in which a technology vendor runs the calculations for the bank and hands over the results. This means the bank does not need to be concerned about the hardware costs associated with running the calculations itself. "We are certainly seeing a shift to managed services, and it is becoming an increasing preference for more and more firms," Blater says.

The term managed services can be used to describe a broad range of things, but it is commonly recognized as a form of outsourcing. In the context of a derivatives business, managed services is defined as managed applications and business functions being deployed on cloud computing infrastructure, and whereby the technology vendor operates its software on behalf of the customer and provides full operational support of its software and often takes direct responsibility for some of the customer's business workflows and operations that are outsourced to it.

In Numerix's experience, the more specific solutions and services derivatives businesses look for in a managed services vendor, as it relates to XVAs, are the following:

- Compute risk sensitivities/Greeks, conduct scenario analysis, VaR and Expected Shortfall for market risk management.
- Perform pre-trade pricing with XVA-integrated prices, for any derivative type (from vanillas to exotics) across all asset classes.

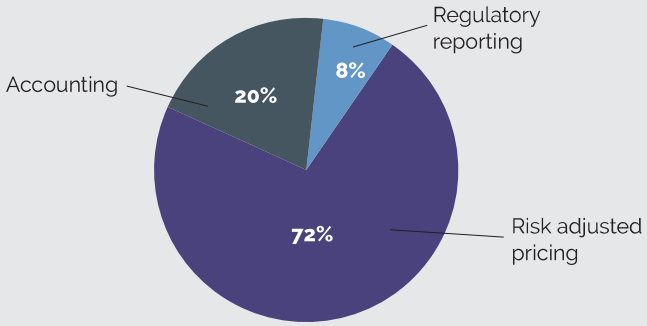
What to Look for When Choosing a Managed Services Provider

Having the right managed services program for the management of XVAs means choosing the right managed services vendor. But how does a firm go about selecting one? Numerix put together a top 10 checklist for choosing the most capable managed services provider. See it here.

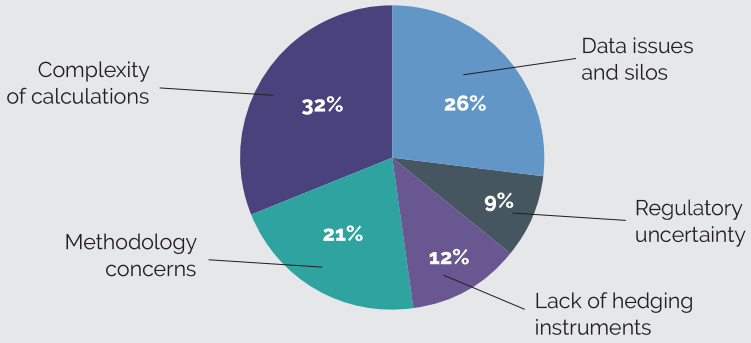
- Perform stress tests, shocks and scenario analysis for regulatory purposes as well as risk management purposes.
- Manage counterparty credit risk and calculate exposure measures (e.g., PFE, EPE, ENE), pricing adjustments (CVA/DVA) and CVA sensitivities for hedging.
- Develop and test derivative trading strategies and hedging programs.

During the Numerix webinar, we polled participants with three questions regarding their XVA practices. These are the results.

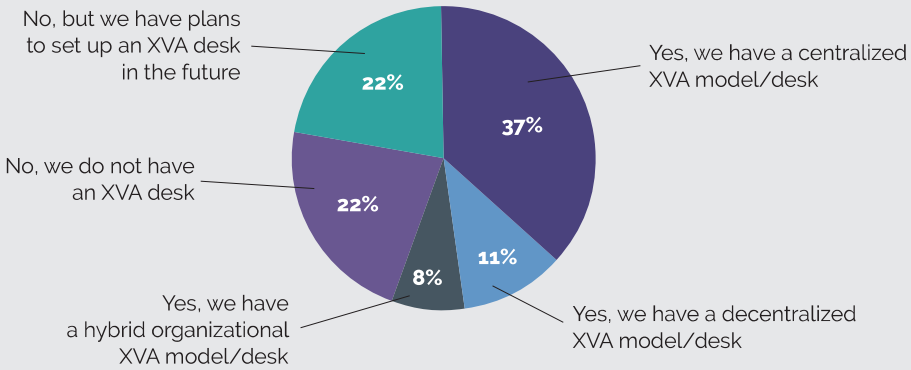
What is your firm's main use of XVA?



What have been the main challenges your firm has faced regarding XVA?



Does your firm have an XVA desk?



XVA Study: Key Findings on Structures of XVA Desks

In the Aite study, more than half of the study's participating banks have a formal, centralized XVA desk. The study further unveiled that the composition of staff as well as desk structure varied from bank to bank, but there was some commonality. "We learned that the centralized desks typically supported global XVA functions for all asset classes and combined pricing, hedging and risk management under the XVA umbrella. So, this means there is a centralization of the XVA business team and of the technology applications as well," says Sinthunont. "Typically on the team is a mix of quants, traders, analysts, some individuals with modeling and valuation responsibilities, and potentially IT staff as well."

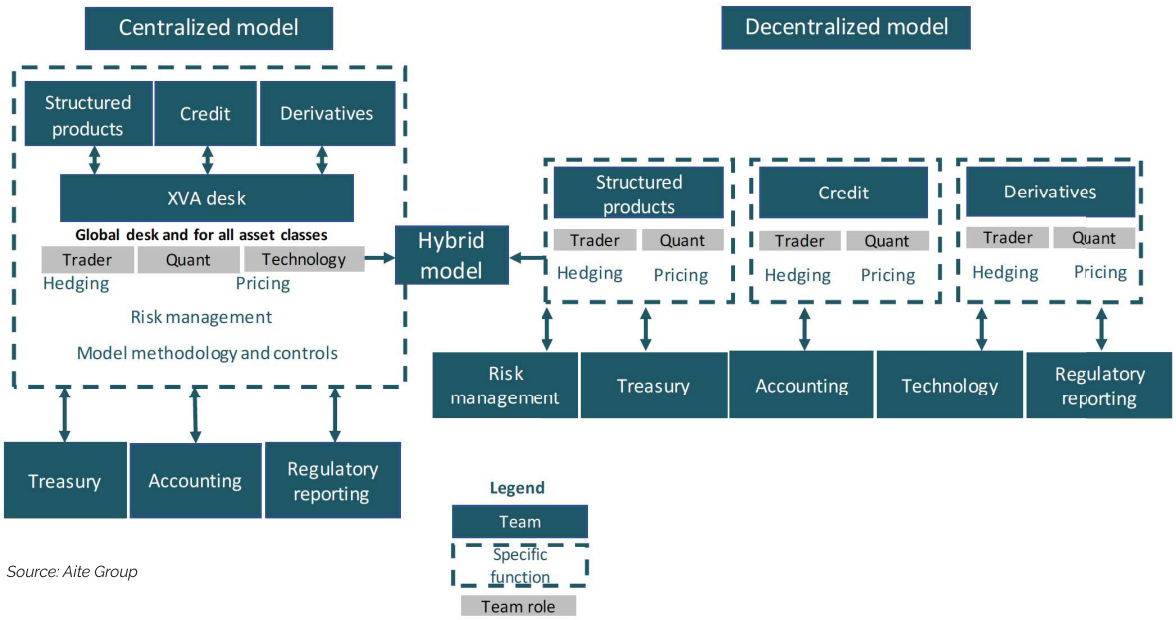
> **"We learned that the centralized desks typically supported global XVA functions for all asset classes and combined pricing, hedging and risk management under the XVA umbrella."**
>
> **— Sinthunont, Aite Group**

The study also indicates there is a centralization of the technology that feeds information to and takes information from other areas of the bank, such as treasury and accounting, in order to satisfy regulatory reporting and other requirements.

When it comes to the benefits of a centralized model for an XVA desk, Sinthunont outlines the following:

- Centralized models benefit from specialized expertise. Rather than pulling resources from various units across the firm, especially when it expands the various layers of XVA, the XVA team makes a consolidated effort, with specific individuals that help with model calibration and have a cross-asset experience that could lead to a better result and the realization of desk mandates and goals.
- Technology-wise, centralized desks may benefit from XVA tools that are specific to the pricing and valuation process rather than a subset of other solutions used by other teams.

Centralized and Decentralized Models for XVA Desks



Source: Aite Group

Some firms, on the other hand, use a decentralized approach to its XVA model. The XVA function, for example, could sit within one of the product teams, whether it's credit, structured products, or derivatives—or it can be a separate function altogether. "XVA models can take many forms. For instance, pricing versus hedging of different asset classes may take place on different desks or across separate teams or groups that are separate from the trading units. We also see that quite a few banks have the XVA valuations in the middle office," explains Sinthunont.

Some banks Sinthunont spoke to may not have a formal centralized desk, but still have a roughly unified XVA effort. "One bank, for instance, does not have a "real" XVA desk in terms of internal deals between a trading desk and the main desk. Instead, it has what it considers a competence center, whereby a team of people provides guidance to the traders and salespeople around XVA. Lastly, another bank has a mixed function desk, which is already located in the risk area, that serves two purposes: risk control of the XVAs and daily quotations for new deals across the bank," he says.

Of interesting note, the study also showed that more banks are thinking about XVA centralization, and may try and centralize a proper XVA desk over the next few years.

New Approaches to Pre-Trade Pricing

Pre-trade pricing check analysis is critical for traders to accurately price trades, and the process is evolving with the onset of KVA and MVA, which is making pre-trading pricing more challenging.

Slobodyanyuk explains, "If we consider a simpler measure such as CVA, to run a pre-deal check we have to project the market value of the new trade into the future for the life of the trade, across thousands of simulation paths. This is called an exposure distribution. Next, the exposure distribution needs to be aggregated with the existing trade projections and the collateral reapplied based on the projection CSA agreement. Using the collateralized exposures, the updated CVA measure is computed. Now we can compare the before and after results and that gives us our pre-deal check."

With KVA and MVA, the complexity amplifies. "With these measures we have to do the same thing as CVA except instead of projected prices and collateralization, we are going to have to take into account VaR measures and XVA sensitivities," she continues. "For those actively managing portfolio risks, they would be interested in rehedging their portfolio based on the XVA sensitivities. They also want to understand how their market sensitivity is affected if they put on a new trade or a new strategy."

A challenge with conducting pre-deal checks on these measures is the need to calculate them in a smarter way to achieve faster results. This is a challenge for many institutions, but there are two ways to achieve this, according to Slobodyanyuk. "The first way to make the calculations smarter is to implement sophisticated dependency tracking. This means that any data that can be reused from an existing calculation, will be. This might seem straight forward and obvious, but this is actually quite complicated because of the sheer amount of data required in these calculations. The other way to speed up the results for the pre-deal check is through the use of algorithmic differentiation, which is revolutionizing the speed with which the calculations are done."

"For those actively managing portfolio risks, they would be interested in rehedging their portfolio based on the XVA sensitivities."

— Slobodyanyuk, Numerix

Embracing XVAs Globally

XVA pricing and management has become a central activity for banks, albeit at different levels regionally. In Europe and the U.S., XVA adoption is more mainstream than in Asia, but Asian banks, the panel says, are having a growing realization they need to follow their European and American counterparts.

While XVA usage is undeniably heavily driven by regulations, and bank size also plays a role in terms of the myriad of XVAs that are managed by a firm, going forward banks globally need to think about the valuation adjustments not from just a regulatory standpoint, but from profitability, capital and risk management, and cost of doing business standpoints.

As all three of the webinar panelists agree, the most successful banks may just be those that fully embrace XVAs as a core component of their derivatives practices.

Ready to elevate your business?

Get started →

More than 550 clients and 90 partners across 52 countries rely on Numerix analytics. Headquartered in the financial capital of the world, with offices around the globe, Numerix brings together unparalleled expertise combined with local market understanding.

Numerix LLC Corporate Headquarters

100 Park Avenue
15th Floor
New York, NY 10017
Tel: +1.212.302.2220
Fax: +1.212.302.6934
www.numerix.com