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XVA in 2019: Valuations' Generation X

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Prepared for:

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EXECUTIVE SUMMARY

XVA in 2019: Valuations' Generation X, licensed by Numerix and produced by Aite Group, explores how banks have evolved over the past few years to incorporate the growing family of trade valuation adjustments for pricing, accounting and regulatory reporting requirements.

Key takeaways from the study include the following:

- When asked to rank the main use cases for XVA, a large portion of respondents commented that accounting requirements drove the banks to calculate credit valuation adjustments (CVA) initially. However, when asked, larger global banks say the main use case for valuation adjustments has become focused on risk-adjusted pricing. Regulatory reporting lags as a core function for valuation adjustments. This is because the reporting function often sits outside the immediate XVA team in the front office and may reside with the accounting team in the back office.

- It is no surprise that most banks Aite Group spoke with have incorporated CVA and debt valuation adjustments (DVA) for at least accounting purposes, since they are accounting requirements. On an extended level, some banks note that the XVAs that are calculated depend on the conditions of a trade or portfolio of trades. For example, it may be dependent upon whether the counterparty is a collateralized one or not.

- Depending on the bank and trade situation, funding valuation adjustments (FVA) may be calculated alongside CVA and DVA; just over half of the banks do this. A similar number of banks calculate capital valuation adjustments (KVA). Aite group expects the number of banks calculating margin valuation adjustments (MVA) to increase as more banks and financial institutions hit the threshold for initial margin (IM) rules for non-cleared trades. For example, one bank suggests it would enter the IM framework in 2020.

- Lastly, KVA is still not widely calculated, some banks view KVA as an entity-level figure and thus more complicated to calculate. One bank suggests that since the Financial Accounting Standards Board (FASB) doesn't recognize KVA or MVA, the bank can't mark them to market. This is an internal issue with accountants, as the XVA desk can calculate the costs but is not allowed to do so because the bank does not consider these costs part of the exit price.

- Half of the banks Aite Group spoke with have some flavor of a centralized XVA desk model. At some banks this centralization is straightforward—one bank implicitly defines its XVA desk as a single unit that operates across three centers. In other instances, the centralized effort goes beyond XVA valuation. Using a different model, another bank centralizes all of its counterparty portfolio management for derivatives market-making, valuation adjustments, and analysis of capital on a single desk.

- Most interviewed banks use third-party vendor solutions for their XVA calculations. Since this research covered mainly Tier-2 and Tier-3 banks, which often have fewer in-house resources than their Tier-1 counterparts, this is not surprising. Although a

few surveyed participants also use some in-house solutions paired with vendor technology, several combine multiple third-party solutions to take advantage of straight-through processing (STP) and varying system flexibility and openness.

- Just over half of banks Aite Group interviewed hedge their XVAs, albeit in different ways. When Aite Group asked banks whether they hedge XVAs, the presence of a trading or an XVA desk as well as differences in risk management resulted in many varied responses.

INTRODUCTION

Since the financial crisis in 2007 and the resulting economic consequences, banks have faced an operating environment of increased global regulatory scrutiny. Central to the crisis was the realization that organizations that were "too big to fail" could fail, resulting in a number of pivotal regulations that include the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank) in the U.S. and Basel III banking rules for Europe. Each provided stricter guidelines and controls over capital markets operations.

Overall, these regulations shone a spotlight on the over-the-counter (OTC) derivatives market, with the aim of creating an environment of transparency and requiring banks to take into account additional risk factors (such as counterparty and liquidity risk) when dealing in OTC markets. This regulatory change has led to the rise of a new generation of XVAs—a family of risk and pricing measures used to denote various valuation adjustments that banks could incorporate in the pricing of securities in order to take account of both the risk and costs of operating a trading desk.

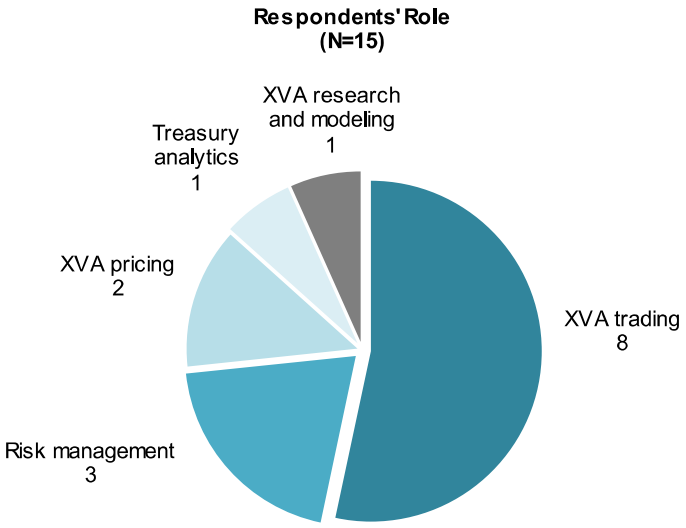
This Impact Report, the first in a sell-side risk series for 2019, examines how banks are incorporating the various flavors of XVA, the motivations behind how they set up their XVA trading desks to manage XVA risk and pricing, and the specific challenges of their XVA journeys, such as how banks are hedging XVA risks. The report also looks at the underlying risk technology to examine how banks are using third-party vendor solutions, in-house-built technology, or a combination of the two to meet complex internal requirements and regulatory demands.

METHODOLOGY

This Impact Report is based on conversations with 15 market participants that include heads or members of an XVA trading desk as well as pricing and risk management functions at regional and global banks. Interviews were conducted between August 2018 and February 2019. Given the size and structure of the research sample, the data provides a directional indication of conditions in the market. To preserve the integrity and reliability of the results obtained, the data has been aggregated into totals.

Study participants are classified into various roles within the XVA desk operation (Figure 1). The largest group of respondents sit directly on an XVA trading desk and engage in daily trading activities. The next largest segment of respondents consists of middle-office risk management roles with responsibilities that extend to XVA risk management. The last significant group of respondents are part of the XVA pricing function, with a few others in XVA research, model management, and treasury analytics.

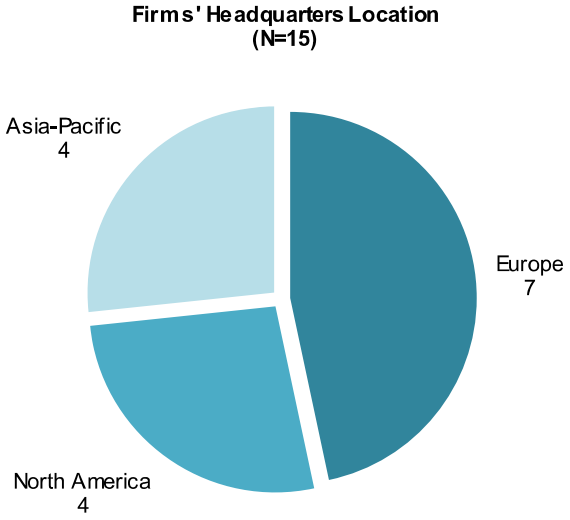
Figure 1: Respondents by Role



Source: Aite Group's interviews with 15 respondents, August 2018 through February 2019

Figure 2 shows participant firms' geographic headquarters and the report's global perspective. Respondents from organizations with European headquarters make up the largest portion of survey participants. As many respondents hail from banks headquartered in North America as do those from banks headquartered in the Asia-Pacific region.

Figure 2: Respondents by Location



Source: Aite Group's interviews with 15 respondents, August 2018 through February 2019

THE MARKET

The world of XVA is a varied one as banks attempt to perform more complex calculations to meet accounting, regulatory, and business needs. This includes the assorted flavors of XVA and the many use cases that banks may have to perform the adjustments. Some firms simply stick to the basics and meet the minimum requirements by calculating CVA and DVA. Others look to calculate a whole host of costs, pre-deal, and have desks to hedge specific valuation adjustments and manage risk as well as profit and loss (P&L). Table A highlights some of the major market trends in both the use cases and technology that are shaping XVA practices at sell-side institutions.

Table A: The Market

Market trends	Market implications
For many firms, the main initial underlying use case for valuation adjustments was for accounting purposes. This has shifted more recently to the need for risk-adjusted pricing.	There are several key reasons a bank may use XVAs. Accounting requirements were cited as the initial reason that banks engaged in valuation adjustments. However, risk-adjusted pricing needs have become the more relevant purpose to date and have shifted the main function of XVA desks. More sophisticated banks with XVA desks tend to put risk-adjusted pricing above all other use cases. Regulatory reporting, such as the capital reporting requirement for CVA risk, is a less commonly cited use case.
CVA and DVA are still the most common XVA adjustments.	While multiple flavors of XVA are used across surveyed firms, CVA and DVA are the most common and are being employed for accounting purposes initially by most firms. Aite Group expects the use cases for CVA in particular to expand the quickest over time and move away from just being calculated as a requirement to being used for pre-deal pricing purposes across trading desks and for hedging activities.
The three secondary valuation adjustments—FVA, KVA, and MVA—are used mainly for the purpose of risk-adjusted pricing and are considered by a subset of larger global banks with XVA desks.	The adoption of XVAs beyond CVA and DVA is happening in steps. Nearly half of the surveyed participants report they regularly factor FVA into the pricing of all trades. However, the take up of KVA and MVA has been slower. One of the most-cited reasons stems from the lack of accounting clarity concerning these two measures. The inability to mark to market was a chief issue with some accounting divisions.

Market trends	Market implications
XVA desks are more often than not part of a centralized desk and function.	Half of the firms Aite Group spoke with have deployed a centralized and coordinated desk. The XVA desk requires a combination of diverse skills for pricing, hedging, and model management, and is made up of a mixture of staff. This includes quantitative researchers focused on model calibration and pricing, traders who handle the trading function, and those with technology backgrounds. Some banks may not have "official" XVA desks but still have a team that loosely forms the XVA trading and pricing function. As these banks start to become more sophisticated and want to manage costs in a consistent manner, centralized desks will aid by pooling experts and supporting cohesion between credit, capital, and funding functions.
Valuation adjustments are not treated homogenously, as banks are split on whether to look at the XVAs in aggregate or individually.	Generally speaking, XVAs are not viewed as homogenous. While the majority of banks admit they view XVAs individually, there is a consensus that in order to arrive at the "right price" XVAs should, in fact, be viewed collectively. This is easier said than done as staff touching XVAs are often from different areas of the banks. Additionally, internal discussions may focus only on certain XVAs.
The overarching motivation behind XVA is to price trades correctly.	The motivation behind the move to XVA varies from bank to bank. At the highest level, the need for transparency and the desire to understand what a transaction is really worth are critical points, as desks wish to align the right pricing and incentives. This initiative needs to be driven from the top to be properly implemented.
Data remains a challenge.	The majority of banks have common issues concerning the challenges that pop up with data integration and XVA. Fragmented data sources flowing into multiple systems raise concerns about getting the right market data, the right calibrations, and the right capital data. For example, CVA relies on credit spreads from market data, credit exposures, and position-level data. From a technical standpoint, many banks have siloed data sources to support valuation adjustment calculations and need to plan accordingly to ensure timely and accurate data flows for these calculations.

Market trends	Market implications
Pre-trade pricing is critical for traders to accurately price a trade and is deployed by banks that have an XVA desk.	Pre-trade analytics, such as measuring the effect of adding or removing a trade with a particular counterparty, have become a key element for traders. The ability to understand the incremental CVA, for example, before putting on a trade is also important for risk management and hedging practices. This creates the need for faster calculations, with technology playing a vital role in supporting the increased demand for near real-time results.
Most banks turn to vendor technology for XVA pricing and exposure analysis.	Many banks rely solely on third-party vendor technology in combination with an in-house build for XVA pricing and risk management. This can be combining a trading system with a valuation engine or depending on an integrated system for both trading and XVA calculations. With the IM rules coming into play for uncleared swaps, the impact on the bank's funding costs will require the expansion of technology capabilities, and this is an opportunity for vendors to step in and support banks.
Hedging XVA is difficult but common for CVA and DVA.	When asked if and how XVAs are being hedged, most banks hedge CVA. The classic issue with CVA hedging is instrument illiquidity and what proxy might be used to hedge P&L volatility. The main instruments for hedging are credit default swaps (CDS), including single name CDS and CDS indices (CDS indices are also used as a proxy hedge). Other standard market instruments, including interest rate swaps and foreign exchange (FX), are also generally used. Banks differ in terms of what they choose to hedge and the strategy they employ to do so. Also, many long-term hedges are costly, so banks do not use them.

Source: Aite Group

THE XVA STORY SO FAR

Banks' adoption of XVAs was spurred by accounting and regulatory standards that focused on counterparty and liquidity risk in response to a decade of localized and global financial crises. Against this backdrop, banks responded over time and looked for ways to adhere to these new rules, accurately price transactions to take account of recognized risk in trades, and protect profitability amid the growing funding and capital costs of dealing in the OTC markets.

THE IMPACT OF THE CRISIS

The first major international warning signs of the dangers of mispricing trades appeared well before the financial crisis of the late 2000s. The lack of standard industry practices to adjust pricing for counterparty risk of default was a major theme of the Asian currency crisis of 1997, which was quickly followed by the Russian debt crisis a year later.

One consequence of these crises was the downfall of the hedge fund Long-Term Capital Management (LTCM), an entity that, through excessive leverage and negative market conditions, eventually needed bailout funds from the Federal Reserve Bank of New York. The event was felt across Wall Street, with most large banks acting as counterparties to trades with LTCM.

Common threads connected these events, including the use of OTC derivatives, exposure to counterparty risk, lax collateral requirements, and the potential domino effect, or contagion, of localized defaults that could spread and damage global financial stability. The world's largest governments took notice of the progression of these systemic events in 1999. At this time, the Basel Committee on Banking Supervision (BCBS) started to build upon Basel I, a regulatory framework that was originally introduced to ensure banks were properly capitalized to withstand financial shocks. The subsequent Basel II Accord, initially published in 2004, had a greater focus on risk than its original incarnation. Basel II set out three main pillars that focused on setting minimum capital requirements for banks, specifying the role of supervisors (regulators and governments) in determining capital requirement thresholds, and lastly, ensuring transparency over how banks report and calculate capitalization figures. Most importantly, the requirements for counterparty risk capital that were introduced in Basel I were explicitly laid out in Basel II.

With the growing use of derivatives and the bailout of LTCM as well as other high-profile business failures (e.g., Enron), banks started to price counterparty risk into transactions with a focus on riskier trades and counterparties. This increase in pricing was charged to traders and often managed centrally with the creation of CVA desks. However, many banks took a passive approach with CVA, not looking through a risk management lens but rather viewing CVA management as simply an insurance policy taken against the profit of a transaction.[1] In these early days, transactions were originally based on historic probabilities of default. Changes to accounting standards in 2005 started to evolve the purpose of CVA desks and also led to the rise of other types of XVAs.

1. Jon Gregory, "The xVA Challenge: Counterparty Credit Risk, Funding, Collateral and Capital," The Wiley Finance Series, 2015.

ACCOUNTING STANDARDS EVOLVE

Accounting standards, such as International Accounting Standards (IAS) 39 and Financial Accounting Standard (FAS) 157, introduced the concept of holding derivatives at their fair value, or the amount for which the instrument could be exchanged or settled on a given day. An exit price would be the value a bank would receive if an asset were sold or traded in an orderly transaction.

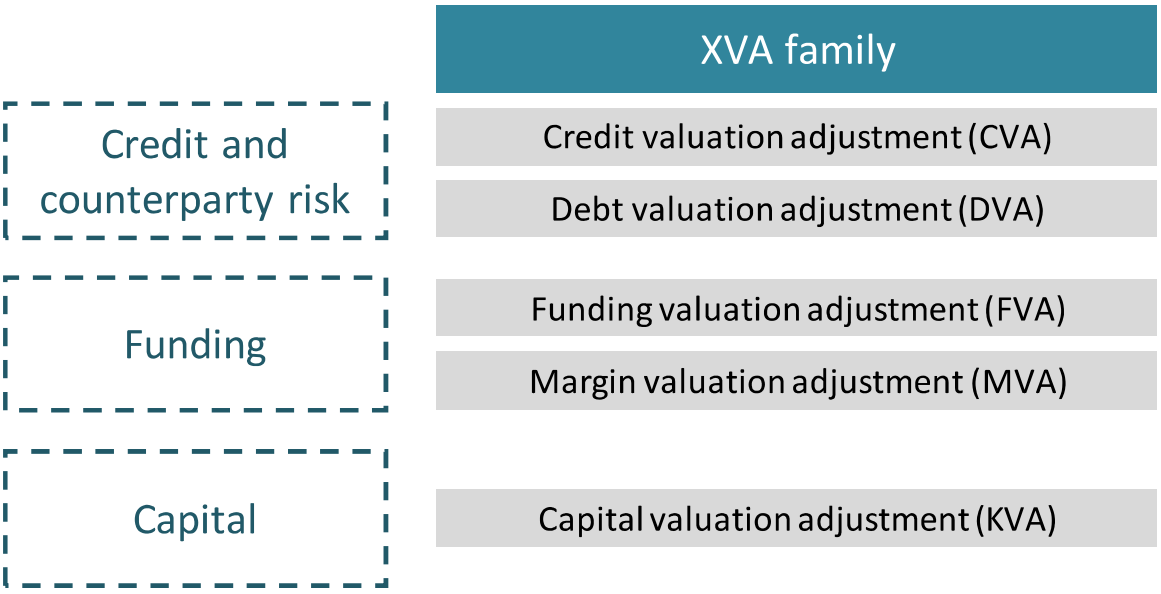
FAS 157 went a little further than IAS 39 and required fair value to include a risk premium that market participants face because of uncertain cash flows. The historical default probabilities became an inaccurate measure to proxy this, and instead, banks turned to credit spreads to compute CVA. Moreover, FAS 157 also required firms to take into account their own credit risk when calculating the fair value, and this gave birth to the next XVA, the DVA. This particular XVA has been met with some criticism because it can have a positive impact on balance sheets and some firms have sought to monetize it.

The latest accounting guidelines, International Financial Reporting Standards (IFRS) 13, were introduced from 2013 onward to replace the IAS 39 and FAS 157 standards. This move provided a common framework for guidance over fair value and thus began the convergence in the global treatment of CVA. As a precedent set with FAS 157, firms needed to also consider their own credit risk, and this consolidated the need for DVA calculations.

THE XVA FAMILY

The financial market events mentioned already helped shape the rise of the first XVAs as accounting element adjustments within the XVA family (Figure 3). Despite the events that had unfolded prior, the world was in for another shock with the 2007 financial crisis—with an aftermath that resulted in the housing market crash in the U.S. and the fall of Lehman Brothers. The events revealed that banks still did not take into account counterparty default risk and hedge CVA effectively.

Figure 3: XVA Family

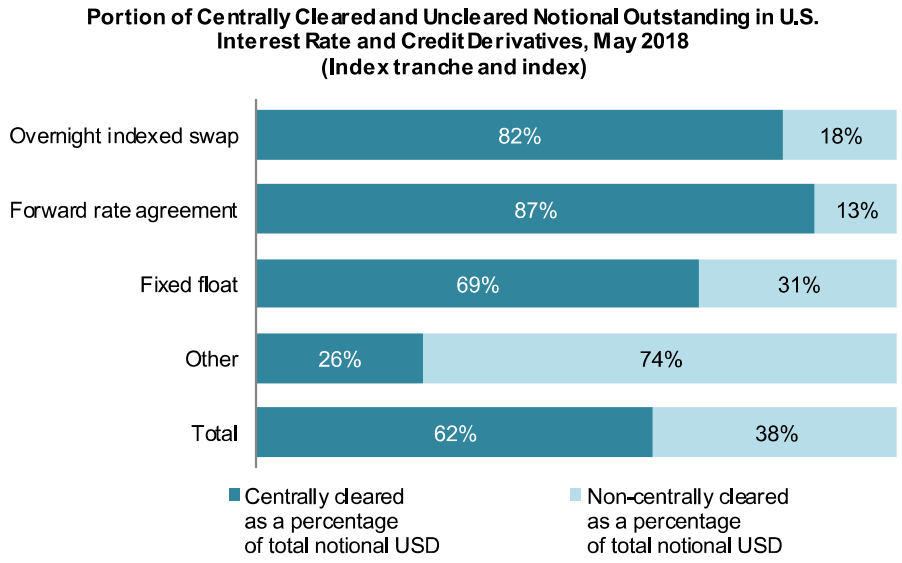


Source: Aite Group

As a result of banks' exposure and the catastrophic impact of the financial crisis, the Group of 20 (G-20) countries came together to move toward a standardized OTC market, changing what traditionally had been a bilaterally risk-managed marketplace to a central clearing model with the emergence of central clearing counterparties (CCPs). Multiple new jurisdictional regulations were expedited to help achieve this goal and came in the form of Dodd-Frank in the U.S. in 2010, the European Market Infrastructure Regulation (EMIR) enacted in 2013, and lastly, the delayed Basel III framework. In terms of progress, as of 2018, the Financial Stability Board reports that approximately 62% of the notional outstanding in interest rate and credit derivatives is centrally cleared (Figure 4), with Europe ahead and Asia falling behind (Figure 5).[2]

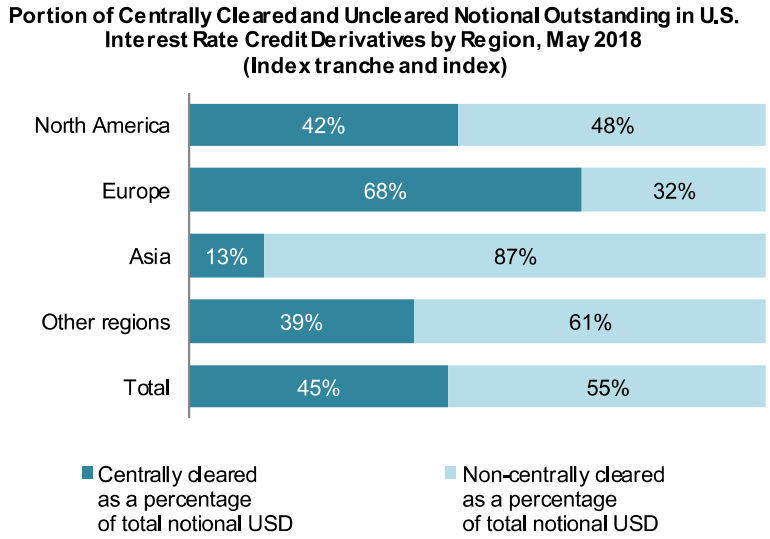
2. "Incentives to Centrally Clear Over-the-Counter (OTC) Derivatives: A Post-Implementation Evaluation of the Effects of the G20 Financial Regulatory Reforms," Financial Stability Board, August 2018, accessed January 22, 2019, http://www.fsb.org/wp-content/uploads/P070818.pdf.

Figure 4: Centrally Cleared and Uncleared Interest Rate and Credit Derivatives



Source: Financial Stability Board

Figure 5: Centrally Cleared and Uncleared Interest Rate and Credit Derivatives by Region



Source: Financial Stability Board

MARKET EVENTS AND REGULATIONS SPUR XVA GROWTH

The legacy of these market events and regulations spurred the growth of XVAs outside the consolidation of CVA and DVA. The first significant impact was on the cost of funding for banks, which was only a few basis points pre-financial crisis but multiplied after the crisis ensued. Funding costs that were once immaterial, usually at the London Interbank Offered Rate (Libor), now needed to be considered to manage desk profitability.

Banks started to capture the impact of funding and liquidity on the cost of a trade with FVA becoming part of the XVA desk remit. The cost would depend on the specifics laid out in a credit support annex (CSA), a legal contract attached to OTC derivative contracts that lists the terms and rules surrounding collateral posting and transfers. Funding costs arise when a bank needs to post collateral and borrow the funds to do so. This cost reflects the market funding risk premium for any uncollateralized portion of derivative portfolios and also for collateralized derivatives for which the term of agreement does not permit the reuse of collateral, once received. This borrowing cost is usually charged by a bank's treasury division to the trading desk. For example, in January 2014, J.P. Morgan reported a US$1.5 billion loss on implementing FVA and suggested it would be a one-off large cost as J.P. Morgan begins to price derivatives to account for FVA in the inception of trades.[3]

Rounding out the funding-related XVAs, MVA is a metric that has been calculated by banks more recently. MVA relates to the funding cost of a derivative trade but focuses on the IM banks are required to post at the beginning of a trade. This can be applied to both centrally cleared trades or non-cleared trades. For non-cleared trades, the IM rules are being phased in from 2016 onward with the largest firms impacted first. It will include smaller firms by 2020.[4] The introduction of IM posting for non-centrally cleared derivatives aims to move more trades to central clearing and reduce systemic risk by ensuring enough collateral is available in times of default. ISDA's Standard Initial Margin Model is the preferred global standard for the calculation of IM for non-cleared derivatives.

Lastly, KVA is an adjustment to reflect the cost of holding regulatory capital as a result of having a derivative position. Basel III introduced the framework for the risk-based capital charge for CVA risk, an extension from just counterparty default risk.[5] Under Basel II, banks were required to hold capital against the variability of derivatives in a trading book, while Basel III introduces a framework to capitalize against variability in CVA. Holding capital has a cost, and banks originally implicitly charged for capital by setting limits around the amount of capital a trade is allowed to consume. More recent advances have led to KVA models, which is the last of the current XVA family.

MOTIVATIONS BEHIND XVA

The history behind the implementation of the accounting standards IAS 38, FAS 157, and more recently IFRS 13 helps explain the results presented in Figure 6 (some banks only had one main use case, while others suggested multiple and ranked them accordingly). When asked to rank the

3. Christopher Whittall, "Derivatives: JP Morgan Books US$1.5bn FVA Loss," Reuters, January 2014, accessed January 30, 2019, https://www.reuters.com/article/banks-jpmorgan-fva-ifr/derivatives-jp-morgan-books-us1-5bn-fva-loss-idUSL6N0KO3BZ20140114.

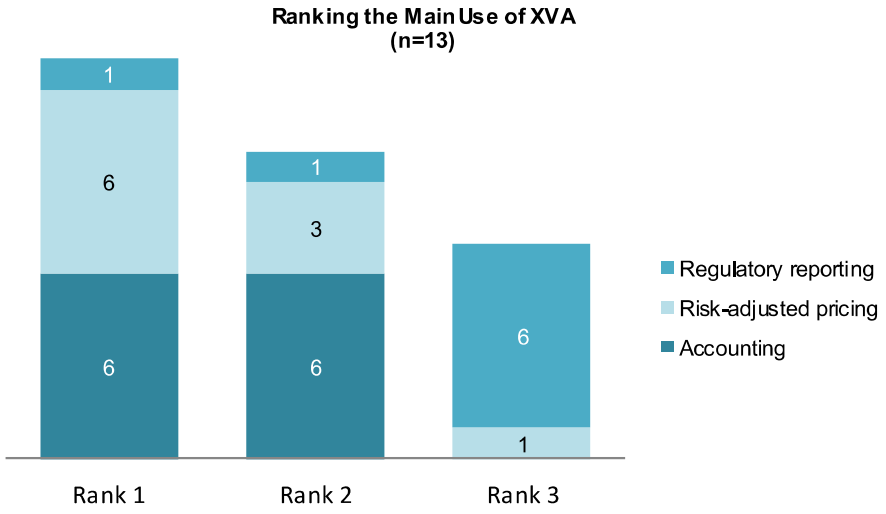
4. "Initial Margin for Non-Centrally Cleared Derivatives: Issues for 2019 and 2020," ISDA, July 2018, accessed January 30, 2019, https://www.isda.org/a/D6fEE/ISDA-SIFMA-Initial-Margin-Phase-in-White-Paper-July-2018.pdf.

5. "Review of the Credit Valuation Adjustment Risk Framework," Basel Committee on Banking Supervision, October 2015, accessed January 20, 2019, https://www.bis.org/bcbs/publ/d325.pdf.

main use case for XVAs, the most respondents commented that accounting requirements drove the banks to calculate CVA and DVA initially. One interviewee pointed to the year 2009 as the first year this was done, as the accounting standard required the bank to mark to market its derivatives book. Since then, even smaller regional banks have engaged in this practice but tend to stop at this point and do not use such valuations for the pricing of trades. This reflects the lack of XVA desks or traditional CVA desks at these banks. One European regional bank commented that the small size of its trading book did not justify the desk function and the bank does not need to consider valuation adjustment in the pricing of trading portfolios.

However, when asked, larger global banks say the main use case for valuation adjustments has become focused on risk-adjusted pricing. This is especially true if the respondent is from a bank with an XVA trading desk. On the other hand, regulatory reporting lags behind the other two reasons as a core use case for valuation adjustments. This function often sits outside the immediate XVA team and may reside with the accounting team. Regulatory reporting requirements include the act of reporting CVA capital charges to regulators as part of the Basel III requirements, but this is not seen as a core mandate of the XVA desk. Overall, however, not all respondents felt they could rank the use cases and instead suggested that all three reasons were jointly responsible for the bank's needs around valuation adjustment. Regulatory reporting has to be right, books and records have to be accurate, and pricing needs to be done correctly to manage the desk's P&L.

Figure 6: Main Use of XVA



Source: Aite Group's interviews with 15 respondents, August 2018 through February 2019

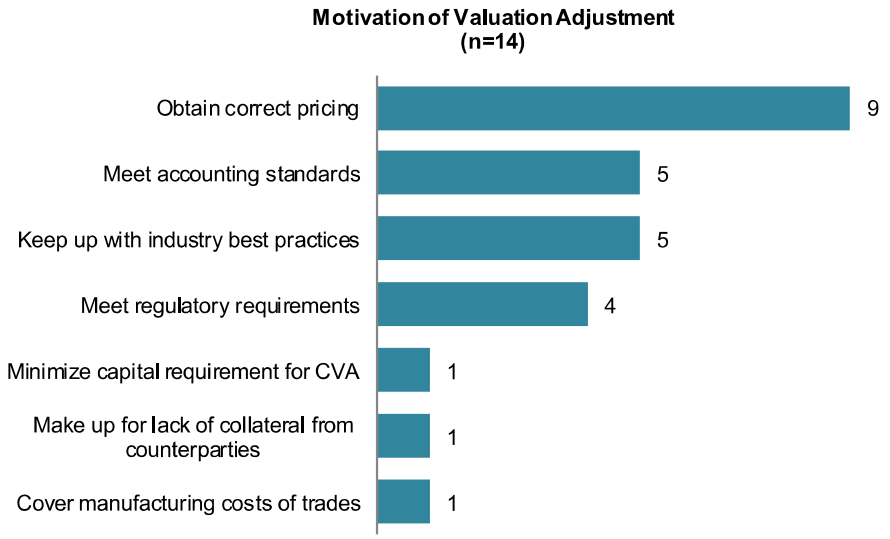
OBTAINING ACCURATE PRICING IS MOST IMPORTANT

Looking to separate the use of XVA from the underlying motivation for the use of XVA, Figure 7 highlights the popular responses provided by banks. Not surprisingly, XVA is very much linked to the desire to calculate correct prices. Depending on the bank, "correct" can mean several things, but for most it is about ensuring that a bank has accurately accounted for the costs and risk of

engaging in derivatives trading. The XVA calculated will also depend on the status of the counterparty and type of derivative instrument, as Aite Group will explore in more detail in the following section.

Some banks view valuation adjustments as the manufacturing cost of derivatives. It may be an accounting requirement, but it is really to make sure the OTC trading is done at the right price so banks can cover hedging costs at the same time. It is no surprise that five of 14 banks cite accounting standards as the underlying motivations to expand further across the XVA world and that four of 14 say the same for regulatory requirements. Five banks indicate they have expanded across the XVA family to keep up with industry best practices. However, a few banks make note of the issue of pricing competition and that incorporating a large number of XVAs may mean the bank loses its competitive edge through overpricing. A balancing act is needed to ensure any adoption of valuation adjustments doesn't hurt the business that a desk may receive.

Figure 7: Motivations Behind XVA Adjustments



Source: Aite Group's interviews with 15 respondents, August 2018 through February 2019

THE MOST COMMONLY ADOPTED VALUATION ADJUSTMENTS

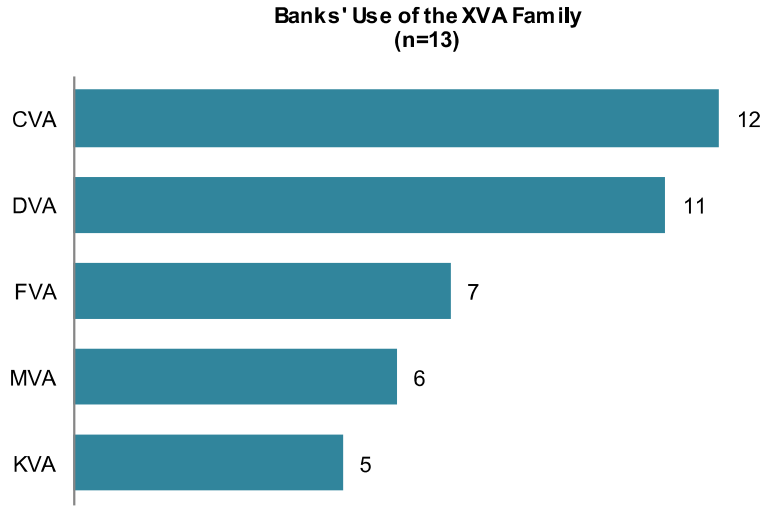
It is no surprise that most banks Aite Group has spoken to incorporate CVA and DVA for accounting purposes at a minimum, as they are accounting requirements (Figure 8). On the simplest level, for example, a regional U.S. bank calculates bilateral CVA for reporting and then uses CVA and DVA selectively to adjust for competitive deals. Most banks see the commonality of these adjustments and link them together. One European bank with a trading desk calculates CVA at the XVA desk level, but DVA calculations are in the hands of the bank's finance department.

On an extended level, some banks note that the XVAs that are calculated depend on the conditions of the trade, for example, if the counterparty is a collateralized one. A respondent

suggests that collateralization affects the extent and type of XVA and risk-weighted assets the bank may be consuming. Thus, the XVA chosen would be affected by product and counterparty type, such as clients that are mainly non-CSA counterparties (e.g., corporate hedging clients). These clients need the OTC trades to operate their businesses and hedge business risks.

Alternatively, another bank suggested that positions in long-term rates and cross-currency swaps require higher XVA charges due to the long-term maturity of these deals. When it comes to commodity products, the bank comments on some of the possible use cases but suggests the short-term nature of those deals affect the need for valuation adjustments, and with equity, the adjustment needs are for the most part minimal.

Figure 8: The Popular XVAs and the Main Use Cases



Source: Aite Group's interviews with 15 respondents, August 2018 through February 2019

Depending on the bank and trade situation, FVA may also be calculated alongside CVA and DVA, and this is done by approximately half of the banks Aite Group spoke to. Banks' opinions are thus split on the matter, with a few banks calculating CVA, DVA, and FVA for every trade. Alternatively, one bank argues that DVA and the funding benefit overlap, so calculating both would be double counting; as a result, it refrains from doing FVA benefit calculations. FVA becomes significant in transactions with the corporate market, where substantial derivative positions are uncollateralized, and banks hedge trades in a market where all derivatives are collateralized. One Asian bank pointed out other specific concerns over the bank's funding curve, with no consensus on what the funding curve should be for the bank, as it is a smaller entity in a smaller market compared to the U.S. or European markets. Large U.S. banks, for example, have adopted the market approach of estimating funding spreads based on the market consensus provided by major market data providers.

MVA AND KVA ARE BECOMING MORE MAINSTREAM

Aside from FVA, some banks have started to calculate MVA and KVA, with six banks indicating they calculate the former valuation adjustment. Aite Group expects the number of banks calculating MVA to increase as more banks and financial institutions hit the threshold for IM rules for non-cleared trades. For example, one bank suggests it would enter the IM framework in 2020. Initial methodological conversations have started, but banks don't understand how to estimate IM and how it will evolve over the lifetime of a trade. Alternatively, another bank notes that the instruments it trades have become more plain vanilla over time and as more deals are cleared, making margin requirements smaller. Overall, there are some methodological concerns and accepted computational challenges around calculating MVA, in particular the Monte Carlo processes needed for forward simulation of IM. However, as regulatory requirements for IM affect a larger number of institutions, MVA will become a more widely calculated XVA.

Lastly, KVA is still not widely calculated. Some banks view KVA as an entity-level figure and thus more complicated to calculate. One bank suggests that since the Financial Accounting Standards Board (FASB) doesn't recognize KVA and MVA, the bank can't mark them to market. This is an internal issue with accountants, as the XVA desk can calculate the costs but is not allowed to do so because the bank does not consider these costs part of the exit price.

THE COMPOSITION OF THE XVA DESK

For banks that have formal XVA desks, the composition of staff, as well as desk structure, varies from bank to bank. While the presence of quantitative minds is a common thread, often a mix of traders and analysts support the use of XVAs. IT staff may be dedicated to the process as part of a formal desk or as part of a larger group that supports the bank more broadly.

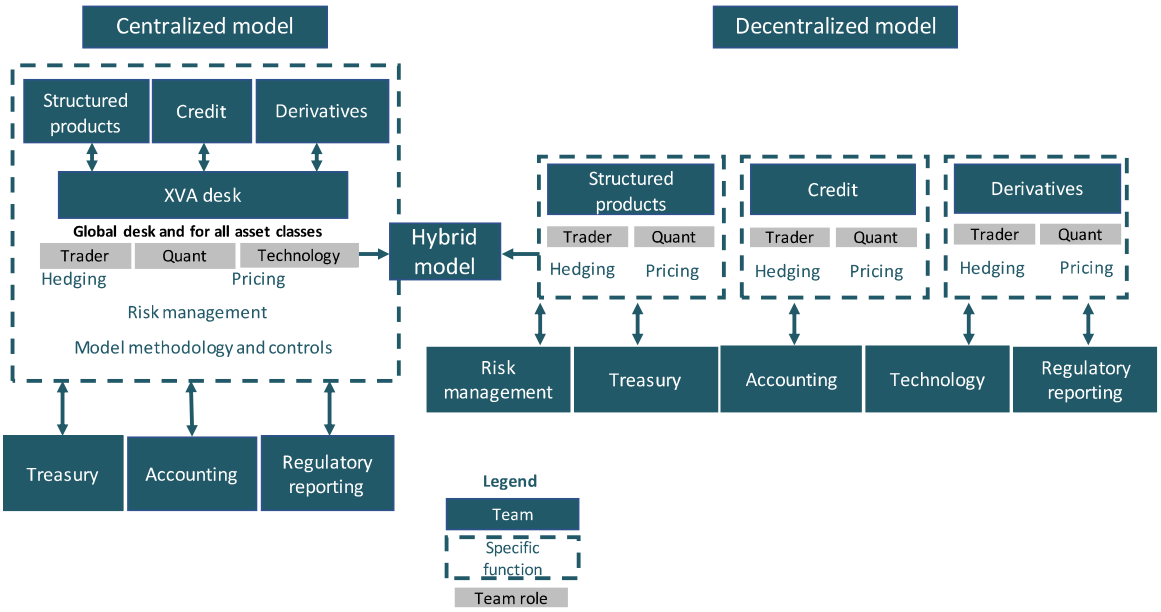
XVA DESKS COME IN MANY DIFFERENT FORMS

There is no one-size-fits-all model to describe the structure of XVA desks at the various banks Aite Group spoke with. Some banks report having a centralized XVA desk that coordinated trading and pricing across North America, Europe, and Asia. Others have desks with a jurisdictional presence depending on how internationally focused they are. Yet other banks think about XVAs but may or may not actually price them, even though they have a trading desk. In some cases, XVA teams are decentralized and sit in the middle office rather than the front office.

While configurations are often bespoke, Figure 9 attempts to characterize centralized and decentralized models for XVA desks. The figure shows centralized desks will typically support global trading for several asset classes and will combine pricing, hedging, and risk management under the XVA umbrella. Core competencies tend to include traders, quantitative analysts, and IT staff. A centralized desk structure 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.

The decentralized XVA model can take on many forms. For example, pricing and hedging of different asset classes may take place on different desks or across separate teams or groups away from the trading desk. One bank Aite Group spoke with deals with XVA valuations through its middle office valuation department and a unified operations team. The valuation department is responsible for all valuations, and it produces XVA figures only for accounting purposes as a cost-utility function rather than a P&L center. This bank is having discussions around XVA centralization.

Figure 9: Centralized and Decentralized Models for XVA Desks



Source: Aite Group

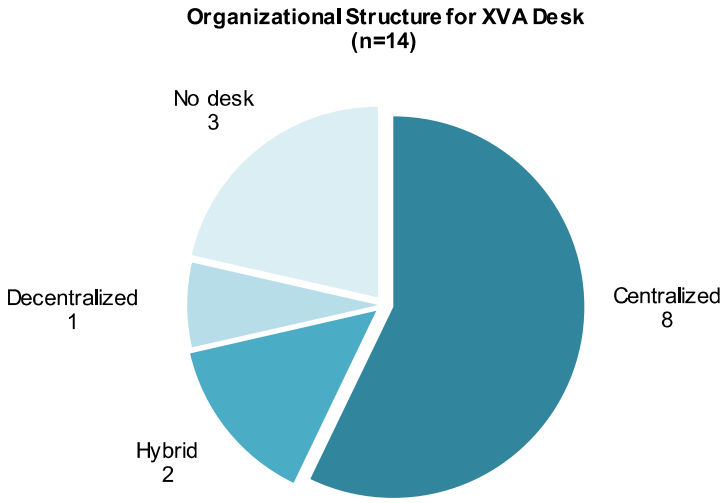
LOOKING BEYOND THE TRADITIONAL DESK STRUCTURE

Aite Group spoke to several banks that do not have a formal desk but still have a unified, centralized XVA effort. One bank mentioned not having a "real" XVA desk in terms of internal deals between desks and other banks. Instead, it has what it considers more of a competence center whereby a team of three people provides guidance to the traders and salespeople around XVA. 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.

Many of the banks Aite Group spoke with have some flavor of a centralized XVA desk model, as shown in Figure 10. At some banks, this centralization is straightforward—one bank defines its XVA desk as a single unit that operates across three centers. In other instances, the centralized effort goes beyond XVA valuation. Using a different model, another bank centralizes all of its counterparty portfolio management for derivatives market-making, valuation adjustments, and analysis of capital on a single desk.

Even among the centralized group, some banks admit "it's complicated" when it comes to defining their model. One European bank points to the presence of a traditional XVA desk that is involved in hedging but adds that there are several other units of the bank that touch XVAs in some way. At this point, it hasn't compiled everything that "has to do with XVA" on that desk. Although technically centralized, teams are still scattered regionally but report to the head of all XVA teams. This bank notes that its pricing team is different from the hedging team.

Figure 10: Common XVA Organizational Structure Across Banks



Source: Aite Group's interviews with 15 respondents, August 2018 through February 2019

BANKS WITHOUT A DESK STILL THINK ABOUT XVAS

Three survey respondents told Aite Group that they have no XVA desk at all but still think about XVAs, typically for competitive and accounting purposes. These banks tend to overlap with the hybrid desks as both typically incorporate certain elements of front- and middle-office functions. One Asian bank pointed to separate teams for pricing, capital, and funding-related matters. These teams are responsible for the pricing and setting up of principles for all XVAs as well as broad funding-related matters (beyond FVA).

Cost plays an important role in the decision to have a dedicated XVA desk. According to a U.S. bank, the materiality of risks coming from the trading desk doesn't warrant the cost of setting up a separate XVA desk. At this time, this bank is using selective risk-adjusted pricing for competitive deals; however, the primary use is accounting-based reporting of bilateral CVA. Should this bank become a swaps dealer at a point in the future, it might consider a formal XVA desk.

PROS AND CONS OF CENTRALIZED XVA DESKS

While only one bank characterized its XVA desk as being decentralized, the ways that banks slice and dice across regions and asset classes vary. Decentralized desks also share some of the features found in the hybrid desk approach. For example, one European bank mentioned having desks in different regions while sharing the middle office, IT, and other functions with other areas of the bank.

Generally speaking, the benefits of a centralized model follow:

- Centralized models benefit from specialized expertise; rather than pulling resources from various points across the firm, the team makes a consolidated effort, leading 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.
- Additionally, centralized desks are more likely to evolve their use of XVAs beyond CVA and DVA to include the newer flavors of valuation adjustments. The use of FVA, MVA, and KVA will continue to be more prevalent for these desk structures.

However, banks have unique organizational structures in terms of staff, technology, global presence, etc. In some cases, the centralized desk structure is not a good fit, and a more flexible approach is appropriate.

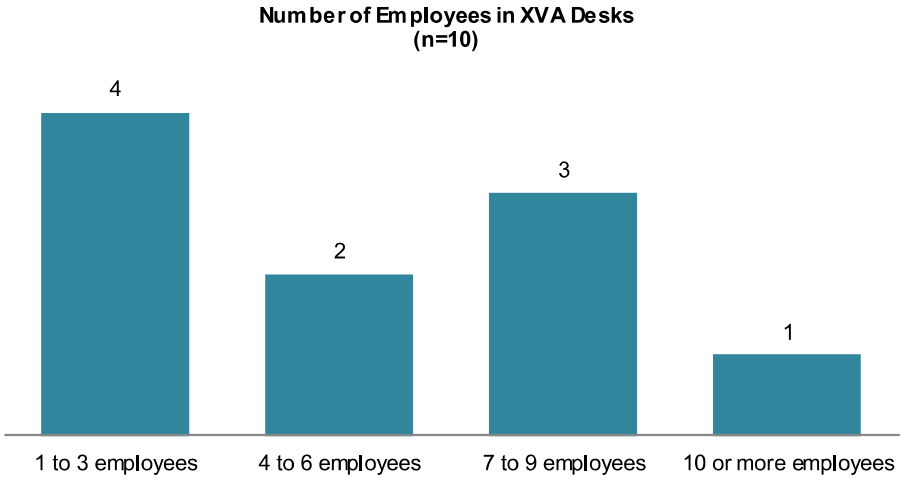
XVA DESK STAFF

Bank XVA desk structures vary greatly in terms of the number of people dedicated to XVA-related functions across interviewed participants. As Figure 11 explains, more than half of the surveyed banks providing staff figures have fewer than seven dedicated employees, while the remaining portion had larger teams.

The makeup of each desk is unique from bank to bank, as no two business models are the same. For example, one European bank has two people doing all the functions rather than hiring quants and traders for specific roles. Another European bank's desk has five traders in addition to a 12-person quant team that manages both the IT requirements and the modeling of instruments. Of the 12 quants, two are dedicated full time to the management of XVA data while another two to three are responsible for XVA pricing tools.

One U.S. bank with a centralized presence has seven people on the XVA desk. This desk is made up entirely of traders. While all the traders are certainly quantitative, this bank also has another quant desk, which works for all of fixed income and FX as well as XVA and utilizes a separate IT department. One European bank has adopted a similar structure on a smaller scale—it has three traders on its XVA desk, which is supported by front-office quants and other trade support staff that assist with XVAs as needed.

Figure 11: Dedicated XVA Desk Staff



Source: Aite Group's interviews with 15 respondents, August 2018 through February 2019

REDUCING P&L VOLATILITY IS A TOP GOAL

Banks' XVA mandates can be summarized by four categories shown in Figure 12. Ten banks indicate that the goals of their XVA desks are to reduce P&L volatility or remain revenue neutral. The same number of participants also use XVA valuation adjustments to foster better risk management.

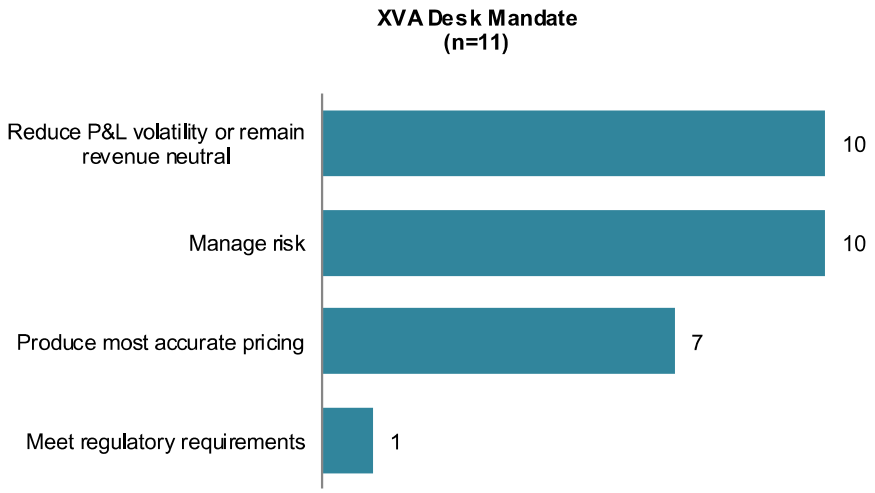
When asked about the mandate of their XVA desk, a European bank said its desk's primary mandate is to obtain a correct fair value (including counterparty value adjustments) of their derivative book. Another bank in the region added it wants to make sure that, overall, it is doing the right trade at the right price. For example, understanding the capital needed to support a 25-year maturity is important when some trades may have been undercharged in previous years. This bank believes people are generally more aware of the cost and return, and have best practices in place when they have to manage the risk.

Interestingly, one European bank suggested it is easier to speak about the mandate of its XVA team (which is not part of a formal desk) in terms of the negative—what it is not. For example, it is not about the hedging of the XVA; instead, the purpose is to give the other traders and salespeople guidance concerning the margin they have to use on the different types of trades. This mandate contrasts with a U.S. bank's desk mandate, which is to facilitate market-making and manage XVA risk with a neutral revenue target.

Banks in the U.S., Europe, and Asia that do not have a formal desk still adhere to certain mandates as they relate to XVA. For example, a European middle-office team mentioned that the pricing of XVA for competition or risk purposes is a goal. A U.S. bank also has a team in place for this same purpose and added that the accounting aspect of CVA was important and a focus.

Seven participants indicated their desk's mandate was to produce the most accurate pricing. Aite Group expects this mandate to grow in popularity as desk structures evolve and as XVAs beyond CVA and DVA are incorporated. Similarly, this change will reduce the number of banks that primarily use XVAs to meet regulatory responsibilities.

Figure 12: Most Common XVA Desk Mandates



Source: Aite Group's interviews with 15 respondents, August 2018 through February 2019

MOST BANKS VIEW XVAS INDIVIDUALLY

Aite Group asked survey participants if they view XVAs collectively or individually, as described by Figure 13. While the majority of respondents said they view XVAs on an individual basis, again, there was no one-size-fits-all response. In fact, some participants mentioned they looked at XVAs collectively as well as individually.

At one European bank, management depends on specific XVAs even though there is a centralized desk. FVA, for example, comes from a separate team but, in the end, is examined by the head of XVA. A different European bank thinks about XVAs collectively because it feels the most important thing is to have the final price be OK. This bank sees managers slicing up the process in different ways since achieving consistency between the XVAs is more important than the process itself.

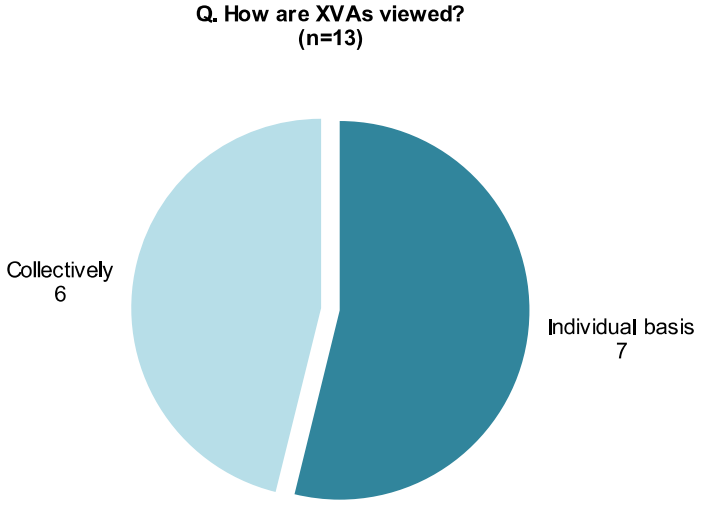
Certain banks exclusively think about XVAs on an individual basis, although this is changing. One Asian bank mentioned that while it thinks about them individually, it should consider them collectively. In an effort to eventually do so, this bank is first trying to sort out CVA, DVA, and FVA—then the rest of the valuation adjustments such as MVA. A European bank has CVA and DVA in the same system for traders and risk control, and it tends to think of them together. However, traders do the traditional calculation for KVA and FVA outside the system, so in that respect, the family of XVA valuations isn't necessarily thought of collectively just yet.

The addition of more XVA metrics beyond CVA and DVA is part of a trend to gain additional insights and move toward a more collective viewpoint. A European bank Aite Group interviewed started using XVAs two to three years ago and looks at XVAs individually, using CVA and DVA only for accounting purposes right now. It is looking at the funding valuation adjustment but admits that using it is a more complex discussion. Although it has infrastructure in place, building up treasury funding curves was mentioned as one challenge. One U.S. bank mentioned that while it thinks about CVA and FVA individually, it talks about the others too. As these conversations evolve, Aite Group expects to see broader adoptions of the full XVA family.

Overall, the benefits of viewing XVAs collectively appear to outweigh the costs:

- Banks that view XVAs collectively tend to have better-defined best practices. Rather than considering the various elements of XVAs piecemeal, these desks apply more dedication and concentration to the process, which leads to more accurate pricing and reduction of P&L volatility.
- Again, the more effective use of technology is a consequence of a collective effort. Teams viewing the various XVAs through the same lens can also use this view for other points along the value chain rather than attempting to aggregate and normalize information at different points along the way.
- Lastly, the various teams within the bank (e.g., treasury, accounting) that touch the XVA process are likely to benefit when banks view XVAs collectively. Working with a single process helps streamline workflow and productivity. It is also easier to break up a combined process versus cobbling the bits together for internal discussion.

Figure 13: Mixed Viewpoints on XVAs

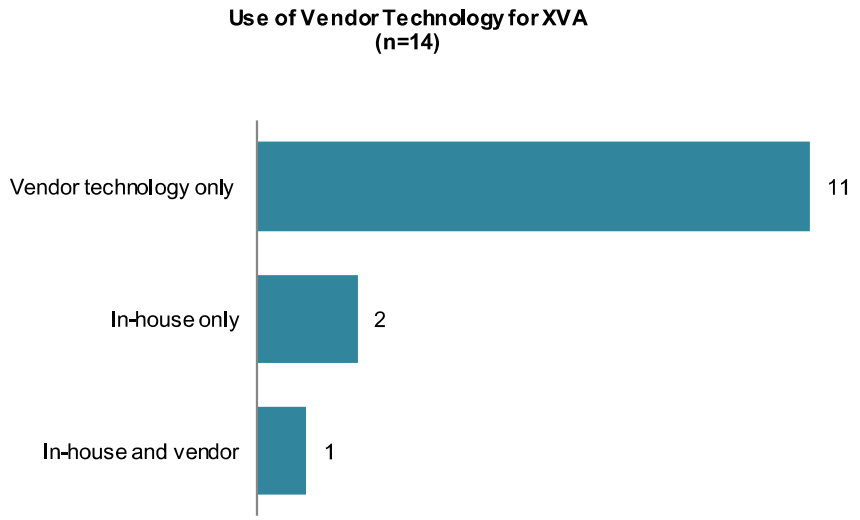


Source: Aite Group's interviews with 15 respondents, August 2018 through February 2019

IN-HOUSE TOOLS OR THIRD-PARTY TECHNOLOGY?

The majority of vendors Aite Group spoke to utilize third-party vendor solutions for their XVA calculations (11 banks). This is not a surprising outcome, since this research focuses exclusively on Tier-2 and Tier-3 banks, which often have fewer in-house resources than their Tier-1 counterparts. Although a few surveyed participants also use some in-house solutions paired with vendor technology, several combined multiple third-party solutions to take advantage of STP and varying system flexibility and openness. Figure 14 summarizes these results.

Figure 14: Vendor Technology Adoption for XVAs



Source: Aite Group's interviews with 15 respondents, August 2018 through February 2019

THE LAYERING OF SYSTEMS IS PREVELENT

One European bank uses a combination of two third-party solutions—an expensive front-to-back solution and a lighter, cost-effective calculator. This bank uses one system for risk and accounting purposes. However, layering another more flexible solution allows this bank to check calculations and model results as well as add new instruments more easily than in its core system.

Another European bank combines an in-house system with third-party technology to run all of its results. This bank starts with risk repricing and then adds all the XVAs to make sure results are consistent along the way. A U.S. bank puts a "best of both worlds" spin on combining an in-house and third-party technology. The combined systems are used for checking calculations and models. This bank feels some portfolios are handled better by in-house systems and others by third-party solutions, and it has the ability to check the overlap between the two.

Few respondents told Aite Group that they rely solely on in-house technology. An Asian bank that does not have a formal XVA desk uses an internal system for pricing and implementing the valuation adjustment and liquidity adjustments—it just does not have a desk to trade it. This bank is considering implementing a third-party solution for XVAs that will overlap with an

existing third-party solution used for risk. Although many third-party systems come with an XVA module, this bank feels that STP is needed for incremental CVA versus a stand-alone risk calculator.

IN-HOUSE TECHNOLOGY STILL PLAYS A STRONG ROLE

One reason banks hang on to legacy technology or are slow to adopt third-party solutions stems from the nature of XVA as a core competency of the bank. Essentially, the bank wants to be in full control of its system, and a third-party solution is not always preferred. As a European bank explains, XVA is also a highly politicized process at a bank. After using an older legacy internal system, this bank switched to a very lightweight, open, and flexible third-party provider to run XVAs daily using Monte Carlo simulations. Value for money was also mentioned as being an important consideration in system choice as a consequence of politics and other factors.

Painful manual processes still exist across the banks Aite Group spoke with no matter the type of system. In one instance, a European bank has trading systems for several instruments—including its XVA pricing tool—which has led to many manual hacks. In this case, staff must get all the trades, market data, and so on into the XVA calculator, which runs every night via an automatic process. Currently, this bank doesn't utilize intraday pricing—if a trader wants to price a new deal, he or she has to input it into the front-office system as well as the XVA calculation engine.

TO HEDGE OR NOT TO HEDGE?

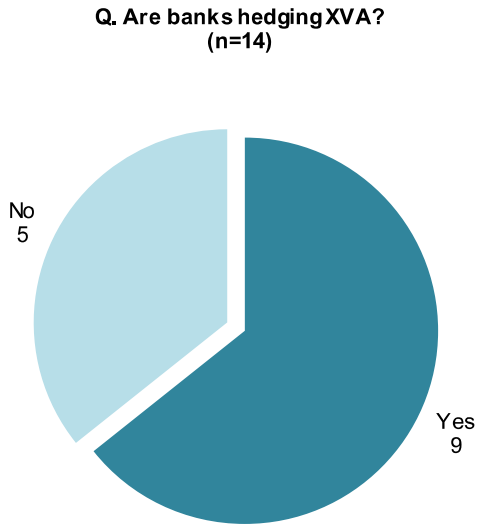
Most of the banks Aite Group interviewed hedge their XVAs, albeit in different ways, as shown by Figure 15. When asking banks whether they hedge XVAs, the presence of a trading or an XVA desk as well as differences in risk management have resulted in varied responses. To highlight some of these nuances, banks were asked to explain their hedging methodology.

For those banks that do hedge, the focus revolves around CVA. One European bank explained that it effectively hedges everything that it accounts for on its financial statements and manages it as if it is day-to-day derivative hedging. Another bank in the region also hedges CVA but using a wide range of hedging instruments: CDS indices, single-name CDS, credit default swaptions, and interest rate and FX derivatives. Hedges are placed as needed and monitored closely. This bank has an XVA desk meeting at least monthly to report on activity and discuss any changes in strategy. A U.S. bank contends that with mark to market, banks have to hedge the risk of CVA, as market and counterparty credit conditions may change over time.

Those banks that don't hedge tend to have an XVA team that is located in the middle office or some other area of the bank that is separate from a formal XVA desk. In one case, a European bank's desk was originally set up as part of the front office but eventually merged into more of a middle-office position aligned with risk. If there is a new deal, this bank charges a CVA premium and must take into account the CVA adjustment for fair value. If the credit spread of CVA changes, managers are informed but no hedges are created at the time. Being aware and having the CVA sensitivities is important. A second bank in the region believes if there is a pressing need to do a trade, it can get the collateralization and, if the need is there, may do some index CDS trading—but this bank stresses it is not actively trading or hedging with a proper desk.

The hedging benefits outweigh costs. Hedging is carried out by banks evolving their processes beyond accounting practices and toward best practices and more accurate pricing. As more banks look to expand their use of XVAs, Aite Group believes they will adopt hedging practices to better mitigate risks—a key practice for controlling P&L volatility and more broadly managing risk.

Figure 15: Hedging XVA at Banks



Source: Aite Group's interviews with 15 respondents, August 2018 through February 2019

DATA REMAINS THE MAIN CHALLENGE

Data is again a four-letter word when it comes to XVA practices. Regulatory uncertainty and data management issues were identified as top concerns by the participants Aite Group interviewed (Figure 16).

Because of the many different inputs XVA models utilize, integration concerns came up in discussions with participants. One European bank mentioned having some challenges with integrating data for netting and collateral agreements. At this time, the bank's process is very manual, and the lack of automation has created pain points. Another concern is that the bank needs new functionalities in its models and systems to capture the new XVAs (mainly KVA and MVA)—including internal policies regarding the treatment of the adjustments from a risk-adjusted pricing and accounting perspective.

Region-specific issues came up in conversation. An Asian bank points to data quality concerns as being top-of-mind as a general issue linked to the underlying credit market in the region. For example, the bank has a CDS curve available for an interbank counterparty, but if the counterparty is on the corporate side, there is no CDS liquidity or data. Everything starts from data and data quality. This bank contends that the skill set (and presumably the risk culture) of

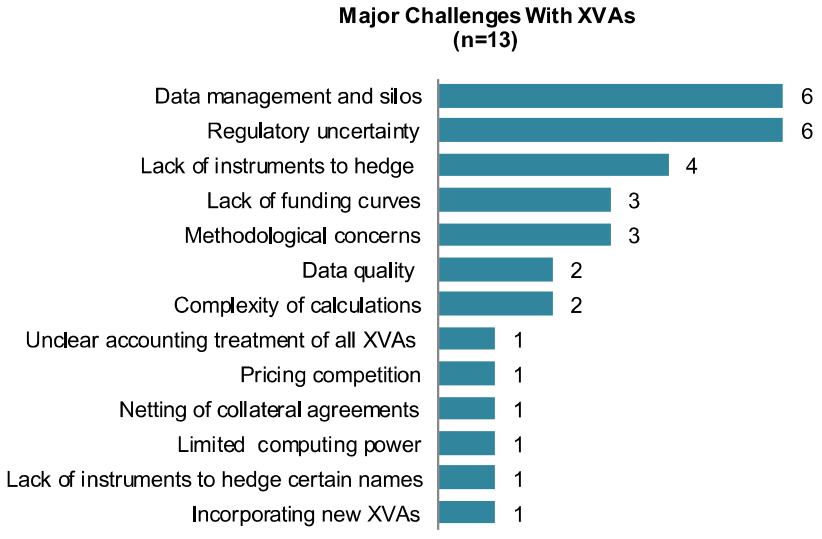
the people is also a concern as many in Asia stick to regulatory requirements for the capital calculation.

Accounting concerns were a recurring theme in discussions Aite Group had with interview participants. As mentioned earlier, one U.S. bank can't mark to market KVA and MVA since the FASB doesn't recognize them. In particular, MVA is the bigger issue as it is a real cost when a trade must be put on that requires IM. While the cost can be calculated, the bank is not allowed to mark it to market because existing accounting rules will not consider it in the exit price. KVA, on the other hand, is not a real cost as it is the return a bank must generate on equity so the bank can cover the cost of capital. Other banks are waiting to see how the industry evolves around KVA and MVA more generally, including the development of a standardized industry approach.

Unclear regulations and inconsistent rules have raised eyebrows at several banks globally. Uncertainty in regulations due to frequent revisions in the methodologies used in XVA calculations were mentioned by several banks as a chief concern. 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. One European bank believes different rules in different jurisdictions create problems when people are looking at the return on regulatory capital. This bank contends that if the regulatory framework isn't the same everywhere it is disadvantageous depending on where you sit.

Data concerns need to be dealt with. Better integration of information and planning should be elevated as top-of-the-list action items for banks looking to evolve their XVA desk practices. As mentioned previously, the most effective best practices will come from consolidated efforts in terms of team makeup, use of technology, and dedication to the valuation and pricing of XVAs using a centralized desk.

Figure 16: Challenges With XVA Practices



Source: Aite Group's interviews with 15 respondents, August 2018 through February 2019

CONCLUSION

Banks:

- **Evolve XVAs beyond accounting and check-the-box regulatory requirements.** A bank may use XVAs for several key reasons. Among them, accounting requirements and the capital reporting requirement for CVA risk were cited as the base cases for valuation adjustments. However, risk-adjusted pricing needs have become the more relevant purpose to date and have shifted the main function of XVA desks. More sophisticated banks with XVA desks will put the use case of risk-adjusted pricing above all others.
- **XVAs are moving past CVA and DVA and are being thought of collectively—keep up with the trend.** The shift to view XVAs collectively rather than individually is a key ingredient to arriving at an accurate final price and reducing P&L volatility, a common mandate across surveyed banks. Nearly half of participants (seven) are now calculating FVA for every trade—a trend Aite Group expects to see more of as the adoption of cleaner risk-adjusted pricing continues to improve.
- **Be warned that poor data integration and quality can stymie the accurate calculation of XVAs.** Because of the many different inputs XVA models utilize, integration concerns came up in discussions with survey participants. While several banks are more comfortable with this process, regional data quality issues and a lack of automation are top concerns. Banks aren't plumbers, and the number of pipes feeding the process must be properly managed by investing in the right technology. The bottom line: Manual processes just don't cut it.

Vendors:

- **Address gaps in offerings or be prepared to lose clients.** As more vendors enter the XVA solutions space it is clear there is still no one-size-fits-all solution. While the majority of banks Aite Group spoke with use a third-party provider, many are using two different overlapping technologies. There is still a perception that internal systems handle certain aspects of XVA pricing better. Additionally, combining lightweight systems with heavier middle-office-to-accounting systems is commonplace. As competition continues to heat up, gaps must be addressed.
- **Be flexible.** Banks often talk about the desire to easily add new instruments into their XVA pricing tools. In some cases, these systems are already part of the existing risk management infrastructure. Other times, separate software is used. Either way, banks complain that some third-party solutions are not open and flexible enough to easily allow for the addition of new instruments as needed, which prevents them from achieving accurate pricing. Newer solutions are addressing these issues and come with an attractive price tag—be ready.

RELATED AITE GROUP RESEARCH

FRTB: Moving Regulatory Targets, Data Pooling, and Modellability, April 2018.

Risk Management Technology Solutions: Defining Gravity, January 2018.

Data Management Vendor Technology: Takin' Care of Business, April 2017.

XVA and Risk Transformation: Establishing the Data Fundamentals, September 2016.

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