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KVA – Profit Deferral and Return on Capital Implications for Pricing, Hedging and Accounting

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KVA has an important difference from the other XVAs. While CVA and FVA change the profit on a trade, KVA only defers the profit. This has implications for pricing, hedging and accounting which I discuss. In particular, many banks calculate KVA using an average return on capital and find that many trades are priced out of the market. I argue that KVA should instead be calculated with a minimum required return on capital. Using this approach, trades will not be priced out of the market unless they are uneconomical.

KVA

KVA (Capital Valuation Adjustment) is an XVA that adjusts the price of a trade for the cost of capital. A description of the calculation of KVA is given in Green, Kenyon and Dennis 2014, and the general arguments for including KVA as an accounting adjustment are given in Kenyon and Kenyon 2016. The arguments in this paper derive from two important differences KVA has from other XVAs (e.g. CVA and FVA).

Differences to other XVAs

Subjective Input – Cost of Capital (KVA-ROC)

FVA is based on a bank's cost of funding – a subjective but at least observable number. KVA however is based on the bank's cost of capital – an unobservable number. A bank can chose the cost of capital to use in KVA calucaltion. The number used represents the return on capital the bank expects or hopes to achieve and so I abbreviate it to KVA-ROC. Generally a single KVA-ROC is used to calculate KVA for all trades across the bank.

Profit Deferral

CVA and FVA account for costs incurred by a bank and as such reduce (or possibly increase) the profit on a trade. KVA on the other hand accounts for the return given to the bank's shareholders and subsequently defers the profit on a trade. That is, KVA moves profits from being taken upfront to emerging over the life of a trade, but does not alter the total profit on the trade.

The profit deferral produced by KVA can be summarised in the equations:

$$\text{Total Profit} \;=\; \text{Trade's Capital Allocation} \;\times\; \text{Trade's Return on Capital} \tag{1}$$

$$\text{Profit Emerging over Trade's Life} \;=\; \text{Trade's Capital Allocation} \;\times\; \text{KVA-ROC} \tag{2}$$

$$\text{Profit Taken Up-Front} \;=\; \text{Trade's Capital Allocation} \;\times\; (\text{Trade's Return on Capital} \;-\; \text{KVA-ROC}) \tag{3}$$

KVA using Average Return on Capital — Issue

According to Risk Magazine's September 2015 KVA Survey, many banks set KVA-ROC to a long-term average return on capital and many banks find that KVA prices trades out of the market. Now an average return on capital is effectively an average return over all the bank's trades, so by definition half the trades will have a return on capital below KVA-ROC. So from equation 3), half the trades will make an upfront loss.

Now, as mentioned above KVA defers but doesn't alter the profit from a trade, so shouldn't price a trade out of the market. However on the trading floor, decisions on whether to execute a trade are generally based on the trade's upfront value or upfront profit, so a trade with an initial loss will not be executed. It is therefore not surprising that banks calculating KVA with an average cost of capital find that many trades are priced out of the market.

KVA using Minimum Return on Capital — Benefit

On the trading floor, decisions are made based on the upfront or current value of a trade. Since trades can be bought and sold instantly this is a simple and effective method. However, in other parts of the bank such as loans and project finance where things can't be traded instantly, the key decision tool is often a hurdle rate of return on capital. Decisions on whether to make a loan or fund a project are based on whether it achieves a minimum rate of return on capital set by the bank.

If KVA-ROC is set to this minimum return on capital then by equation 3), only trades with a return on capital below the bank's required minimum would have an upfront loss. So, using a minimum return on capital, banks can continue to make trade execution decisions based on upfront profit – that is, reject trades with an upfront loss – and would only reject trades with a return on capital below the required minimum. In other words, setting KVA-ROC to the bank's required return on capital would align the trading floor current value decision making process with the return on capital method used in other parts of the bank.

Economic Cycle

Another consideration in setting KVA-ROC is the economic cycle. Any firm's return on capital will vary through the cycle as the available business opportunities change. During a downturn the firm can choose whether to tie up capital in lower return projects or save it and wait for opportunities to improve. Similarly a bank can choose to tie up capital in lower return trades or wait for better trading opportunities.

KVA-ROC should move in line with this decision. If the bank choses to wait for better opportunities then KVA-ROC should remain fixed. If it decides to put capital into lower return trades then KVA-ROC should decrease so they can be executed without an upfront loss. By tasking traders with maximising KVA-adjusted upfront profit and moving KVA-ROC in line with management's decisions on required returns, these decisions would automatically influence trader's actions.

KVA - P&L Impacts & Hedging

Although KVA does not alter a trade's total lifetime profit, its profit deferral property mean that it alters a trade's value both initially and throughout the trade's life. I break this effect into three categories and briefly discuss each.

Initial Price
As discussed, KVA defers profits and so reduces a trade's initial value.

During the life of the trade due to moves in rates
Movements in rates will affect a trade's capital allocation and therefore its KVA and value. Similar to CAV and FVA these impacts can be hedged. However, it's once again worth noting the difference due to profit deferral. Any reduction in a trade's price from a move in KVA will be followed by increased profit over the remaining life of the trade. Therefore, it may seem unnecessary to hedge these P&L impacts, since they don't affect the total profitability of existing trades. However, these changes in KVA do affect the bank's P&L indirectly. This is because increases in a trade's capital allocation mean there is less capital left over to be allocated to other trades. Put another way, a change in the capital per trade, changes the number of trades a bank can execute and the profit it can make.

During the life of the trade due to changes in KVA-ROC
As described above, the bank's management may choose to change KVA-ROC to reflect changes in the bank's required return on capital due to a changing business environment. This change in KVA-ROC changes the KVA for all trades and cannot be hedged. The P&L impact should therefore be excluded from the KVA desk's performance assessment as it is beyond their control. It is important that trade values be changed in line with the adjusted KVA though as this feeds decisions on whether to keep or exit trades (see example below).

Example: Change in KVA-ROC prompts trade to be exited

1) During a downturn a bank cannot find enough high return opportunities so lowers its required return on capital and its KVA-ROC accordingly.

2) A trader then executes a deal that has a positive value.

3) When the economy improves and more profitable opportunities arise, the bank raises KVA-ROC.

4) This increase in KVA-ROC increases KVA and gives the trade a negative value and a sudden loss.

5) The bank is able to exit the trade for $0 and books a profit since the trade had a negative value.

It may seem that changing KVA-ROC produces arbitrary changes in trade prices. But the changes in price are reflecting the actual change in value of the trade to the bank caused by a change in competing opportunities for the assigned capital. It is a bit like how changes in interest rates affect bond prices, though interest rates are an observable contractual return, and return on capital is a non-observable expected return.

Accounting

To recap, the key KVA input parameter, the cost of capital or KVA-ROC, should be set to the bank's hurdle rate of return on capital. If the bank adjusts its hurdle rate though the cycle then KVA-ROC should be adjusted too. A KVA accounting adjustment produced this way also makes sense as it gives a credible exit price. If a trade is sold into a competitive market of other banks, and we assume all banks have similar hedging and borrowing costs, then the highest offer will be the bank applying the lowest cost of capital to the valuation. Similarly, all banks in the market move through the same economic cycle so will likely change their hurdle rates together.

A KVA accounting adjustment with cyclically adjusted KVA-ROC would have the effect of smoothing P&L since decreasing KVA-ROC during downturns would increase trade values, and the opposite during booms. Allowing banks to set and move KVA-ROC would also allow them to manipulate P&L by selectively moving profits forward or back in time. However, provided KVA-ROC is reported separately, analysts can easily remove it.

Greater transparency could also be achieved by requiring banks to publish the KVA-ROC used in their calculation. Admittedly this raises issues of information signalling – banks may publish a higher KVA-ROC hoping to persuade the market of a strong business and thereby lower their borrowing cost. However, stronger information signalling is given by a bank's actual capital decisions; paying dividends and issuing or buying back stock. Changes to KVA-ROC would have to move in line with these decisions to avoid confusing the market. Ultimately, banks would likely move their KVA-ROC values together and only differ from the pack if the market actually believed their business was significantly different.

Summary

Unlike the other XVAs, KVA defers profits rather than altering them. KVA can be a useful tool for pricing and hedging provided this profit deferral is considered. By calculating KVA with its minimum required return on capital, a bank can align the trading floor current value decision making process with the return on capital method used in other parts of the bank. KVA calculated in this way would also make a sensible accounting adjustment, aligning trade valuations with exit prices in a competitive market. If a bank changes its required return on capital with changes in available trading opportunities then KVA-ROC should be changed as well.

Acknowledgments

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The views expressed here are those of the author and not of his employer.