

RAZOR RISK CAPITAL EFFICIENCY UNDER FRTB

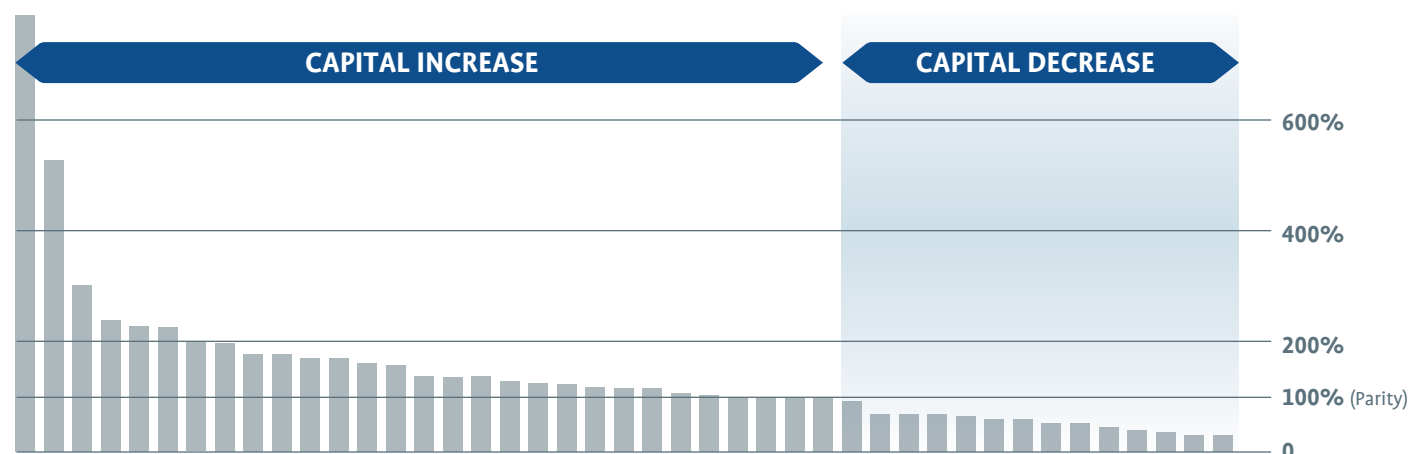


Achieving Capital Efficiency under FRTB

CAPITAL IMPACTS

With the forthcoming FRTB standards due to be implemented at the end of 2019, banks have been busy assessing capital impacts. When combined with other regulations such as increased Basel III capital requirements, Dodd Frank Volcker Rule, bilateral margining requirements, IFRS 9, IRRBB, SA-CCR and SA-CVA, capital consumption and performance have become a greater focus more than ever. As each desk needs separate approval for IMA as opposed to SA, the choice of desk structures of banks will have significant influence on the overall market risk capital requirements. The BCBS-352 (FRTB) regulations define trading desks as “a group of traders or trading accounts that implements a well-defined business strategy operating within a clear risk management strategy”². In order for banks to determine capital impacts before implementation, a series of hypothetical scenarios should be set up relevant to the firm’s portfolios. The baseline test would be the current desk structure post Volcker rule (for the U.S. and Canada) and production portfolios, whereby both the standardized and internal model capital results are calculated and the minimum of the sum of both approaches are calculated to arrive at a probable desk structure.

As part of the most recent Interim Impact Study results from March 2016 (BCBS - d346)¹, most firms experienced an overall greater capital requirement when using a mix between Standardized and Internal Models. The average weighted simple mean increase in capital under the new framework was 41%. One third of participants recorded a fall in capital charges.



Source: Basel Committee on Banking Supervision¹

While much of the initial focus of the market risk capital reforms has been on the SBA and Expected Shortfall components, attention is turning towards internal Default Risk Charge models that adhere to the Basel committees’ guidelines. Currently, the IRC and CRM components of the Basel II.5 reforms commonly produce an outsized capital charge of 60-70% of the overall market risk charge. The added cost and complexity of producing an internal DRC model may provide the justification to invest in a sophisticated IMA approach. The following table is a breakdown produced by the Basel Committee on Banking Supervision (BCBS) of estimated capital impact across components.

GLOBAL LEVEL CHANGE IN MARKET RISK CHARGES IN THE TRADING BOOK BY COMPONENTS

(Breakdown By Risk Measure, in per cent)

RISK MEASURE	INTERNALLY-MODELLED				STANDARDISED	GRAND TOTAL
	ES	DRC	NMRF	TOTAL	DELTA, VEGA, CURVATURE, AND DEFAULT (TOTAL)	
SIMPLE MEAN	-39	92	83	54	128	41
MEDIAN	-43	64	39	13	51	18
25TH PERCENTILE	-62	7	-19	-32	-62	-36
75TH PERCENTILE	-18	192	72	76	195	70

NOTES: A small number of banks were excluded from the simple mean results for ES, IDR, NMRF, Total (internally-modelled), Standardised and Grand Total for having an absolute percentage change of 1000% or higher. The simple (ie unweighted) mean figures for each of these columns were calculated separately.

Multiplier for ES in this analysis is assumed to be 1.

Source: Bank of International Settlements¹

APPROVAL PROCESS

Model approval will now be performed at the desk level. National regulators will be required to finalise the text of its own FRTB regimes by 2019 and begin the process of approving models during the course of the year with data that banks will need to collect through the prior year.

The desk level approval process has become more stringent since Basel II.5 with the introduction of the P&L attribution test. The test is designed to identify whether a bank's trading desk risk management model includes a sufficient number of risk factors that drive the trading desk's daily P&L. According to the BCBS test (BCBS – 352)²:

THE P&L ATTRIBUTION REQUIREMENTS ARE BASED ON TWO METRICS:

The mean of the difference between the risk-theoretical and hypothetical P&L (unexplained P&L) divided by the standard deviation of the hypothetical P&L.

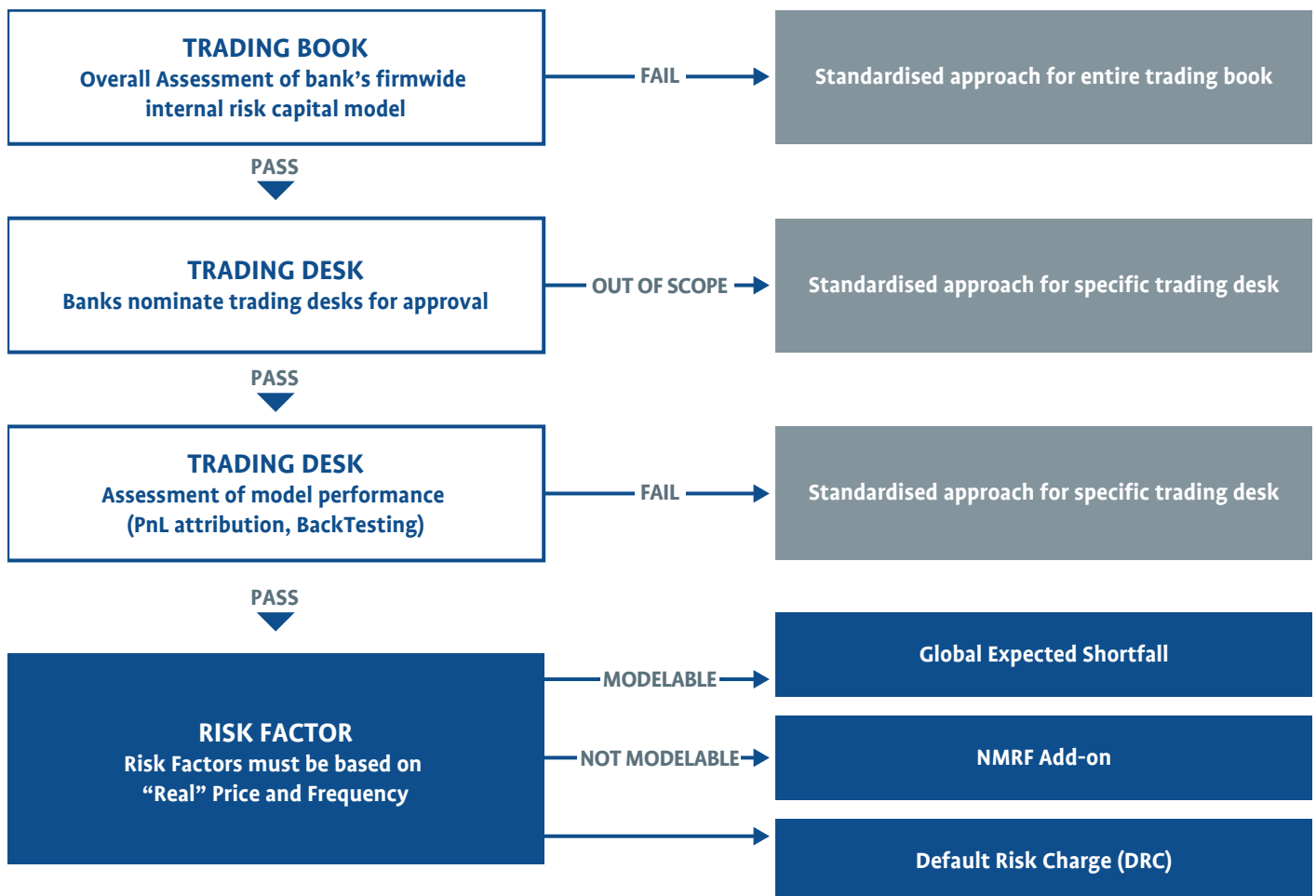
The variance of the unexplained P&L divided by the variance of the hypothetical P&L².



$$\left| \frac{\text{Mean}_{\text{unexplainedP\&L}}}{\text{StDev}_{\text{hypotheticalP\&L}}} \right| < 10\% \text{ and } \frac{\text{Variance}_{\text{unexplainedP\&L}}}{\text{Variance}_{\text{hypotheticalP\&L}}} < 20\%$$

There is still confusion as to the correct approach for reconciling front office P&Ls (hypothetical P&Ls) and middle office P&Ls (risk theoretical P&Ls) with two conflicting versions. The conflict originates from the wording of the FRTB text in the appendix and the glossary. Both sections suggest that the hypothetical P&L be calculated with the front office pricing models. The more complex version suggests that the risk theoretical P&Ls can be calculated with the risk models, whereas the simpler industry preferred version suggests that risk-theoretical P&Ls be calculated with the front-office models using the risk system's reduced set of risk factors. The strong version brings up a host of issues around locality and timing of calculations for front office P&L and risk P&L, in addition to synchronicity of data.

THE FOLLOWING DIAGRAM SHOWS THE APPROVAL PROCESS:



CAPITAL ANALYSIS

When planning implementation, analysis should be performed to understand the capital implications of various combinations of asset classes. All desks will be required to calculate the standardized method as a fallback for calculating capital if the P&L attribution test fails. Issues other than the capital impact may influence how banks choose to structure desks and which method will be used.

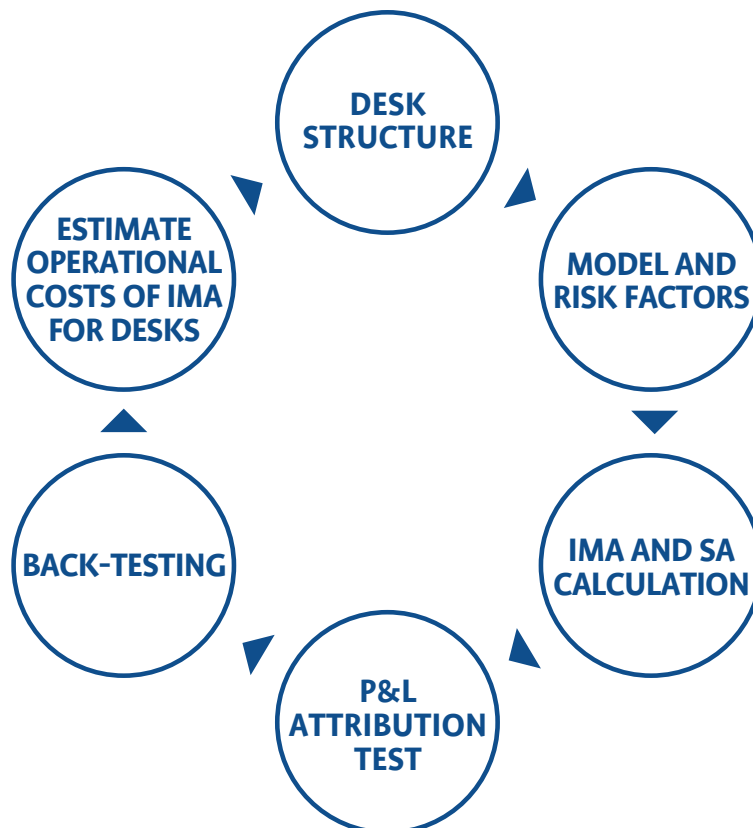
SUCH QUESTIONS INCLUDE:

- How straight forward will the model approval process be?
- Will it be done in time to meet the deadline?
- Will the front office and middle office P&L results pass the P&L attribution test?
- How many positions require inputs from Non Modelling Risk Factors? Can alternative risk factors or simpler models be used instead?
- Is there a third party that can alleviate NRMF issues and how costly is the service?
- Does the Internal Model pass back testing and still fall within the acceptable floor versus the standard model?
- How costly is the software and hardware infrastructure build and implementation for IMA?
- Will the performance of an internal model solution be able to meet an internal SLA window?
- Will the firm be able to implement and have time to spare to gather the twelve months of data required to submit for approval?
- Regulators are in discussion to create a floor for IMA to SA. If the floor is too high, say 80% of the SA approach, then do the costs of implementation outweigh the capital relief?

Banks are concerned about cost of capital and many of these factors add to the overall cost. In order to maximize capital efficiency, various combinations of SA and IMA need to be tested. If desks have small decreases in capital charges under the IMA, consideration needs to be given as to whether it is worth the time, effort, complexity and increased cost required to implement the IMA approach.

In order to form a view on an appropriate desk structure, firms should follow an iterative hypothetical scenario testing process.

CAPITAL OPTIMIZATION PROCESS



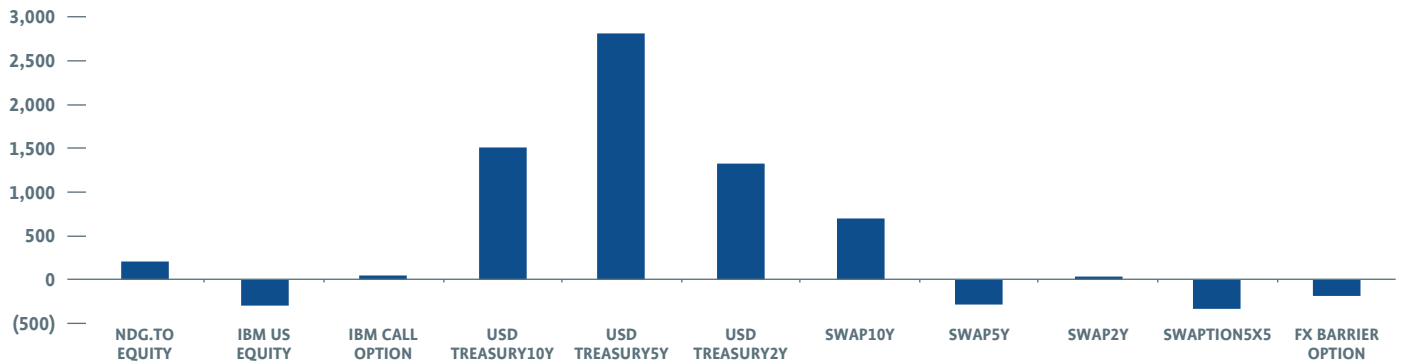
THIS PAPER FOCUSES ON THE SENSITIVITY BASED APPROACH AND A SCENARIO BASED EXPECTED SHORTFALL. WE WILL RUN THROUGH TWO EXAMPLES WHERE THE HYPOTHETICAL SCENARIOS PRODUCED SOME UNEXPECTED RESULTS.

USE CASE 1

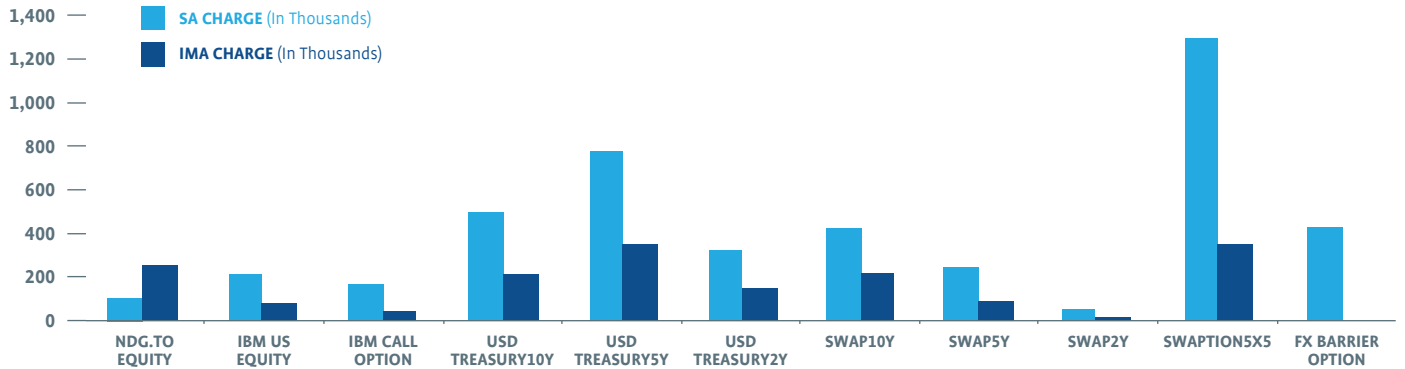
In this use case we present a hypothetical portfolio with interest rate, FX and equity positions. The use case only calculates the sensitivity based approach for the SA and calculates Expected Shortfall for the IMA.

HYPOTHETICAL POSITIONS AND MTM

(In Thousands)



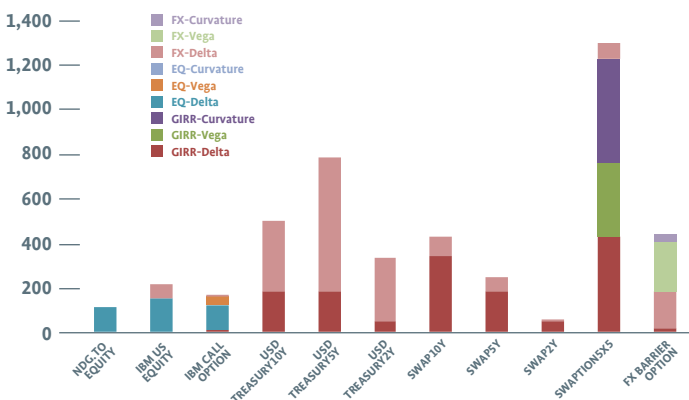
Generally speaking, the SA charge for each instrument will be higher than the IMA charge; however in the following use cases we show that due to unusual volatility, the IMA charge can in some instances be higher than the SA charge as we see in the following diagram for the NGD.TO.equity. However, this can be diversified away through appropriate asset mix.



Using the Standardized Approach we calculate capital components for the portfolio reported in CAD as diagrammed. By inspecting the NGD.TO.Equity, we can see that it only has a charge for equity delta as it is a common stock, whereas IBM.US.Equity has both equity delta and FX delta since it is a USD denominated equity and there is translation risk. In the Internal Model Approach we calculate Expected Shortfall attributed by position and breakdown of risk types.

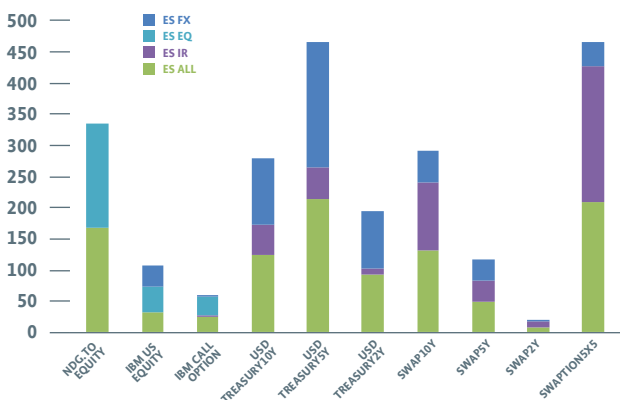
SENSITIVITY BASED APPROACH

(In Thousands)



INTERNAL MODEL BASED APPROACH

(In Thousands)



The hypothetical use case see certain asset classes structured by desk whereby interest rates and equities are calculated using the Internal Model Approach, interest rate derivatives and FX derivatives are calculated using the Standardised Approach. The total capital charge of SA + IMA is \$2,432,534.34, a significant savings from the all SA desk structure.

TRADING BOOK DESKS	INSTRUMENTS	IMA CHARGE	SA CHARGE	
DESKS UNDER IMA	IR Desk	3 Bond, 3 Swap	824,533.00	1,860,024.44
	EQ Desk	2 EQ, 1 EQ EuroOption	267,914.00	193,906.20
	Total IMA Desk	Mix	887,307.00	1,953,023.80
(THE REST) DESKS UNDER SA	IR Derivatives	1 Swaptions	NA	1,292,580.74
	FX Derivatives	1 FX Barrier Option	NA	430,532.27
	Total SA Desk	Mix	NA	1,545,227.34
TOTAL	All Desks	All	NA	2,796,738.41
TOTAL CAPITAL CHARGE				2,432,534.34

If we were to move the interest rate swaptions onto the IMA methodology, we see that the new capital charge is \$1,515,862.27, a total capital savings of \$0.916 million or 38%.

CURRENT DESKS

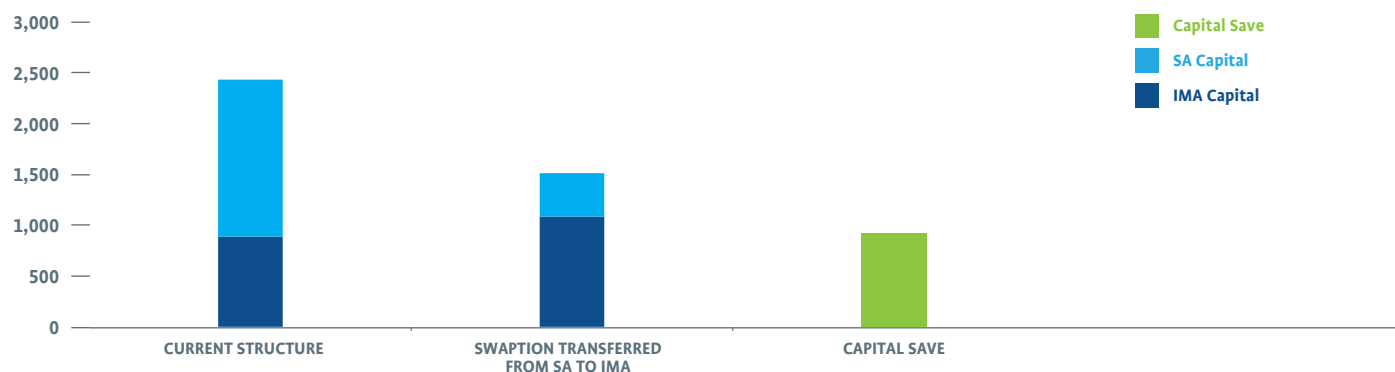
TRADING BOOK DESKS	INSTRUMENTS	IMA CHARGE	SA CHARGE	
DESKS UNDER IMA	IR Desk	3 Bond, 3 Swap	824,533.00	1,860,024.44
	EQ Desk	2 EQ, 1 EQ EuroOption	267,914.00	193,906.20
	Total IMA Desk	Mix	887,307.00	1,953,023.80
(THE REST) DESKS UNDER SA	IR Derivatives	1 Swaption	NA	1,292,580.74
	FX Derivatives	1 FX Barrier Option	NA	430,532.27
	Total SA Desk	Mix	NA	1,545,227.34
TOTAL	All Desks	All	NA	2,796,738.41
TOTAL CAPITAL CHARGE				2,432,534.34

WHAT IF SCENARIO (Moving Swaption from SA IR Derivatives desk to IMA IR Desk)

TRADING BOOK DESKS	INSTRUMENTS	IMA CHARGE	SA CHARGE	
DESKS UNDER IMA	IR Desk	3 Bond, 3 Swap, 1 Swaption	1,016,971.00	2,633,007.21
	EQ Desk	2 EQ, 1 EQ EuroOption	267,914.00	193,906.20
	Total IMA Desk	Mix	1,085,330.00	2,727,815.37
(THE REST) DESKS UNDER SA	IR Derivatives		NA	—
	FX Derivatives	1 FX Barrier Option	NA	430,532.27
	Total SA Desk	Mix	NA	430,532.27
TOTAL	All Desks	All	NA	2,796,738.41
TOTAL CAPITAL CHARGE				1,515,862.27

THE DELTAS ARE SHOWN HERE

(In Thousands)



USE CASE 2

As we demonstrated previously, NGD.To has a higher charge under IMA than SA. In this use case, we followed our intuition by testing it in the SA desk to understand the capital impact. After the transfer, the IMA charge was reduced, however the SA component increased significantly. The total charge, instead of going down, goes up by 2%, resulting in a negative capital save. The reason for the unexpected result is: Though NGD position alone is charged higher capital under IMA, transferring the NGD equity position from IMA to SA cannot reduce the capital charge due to better diversification benefit in IMA.

BEFORE

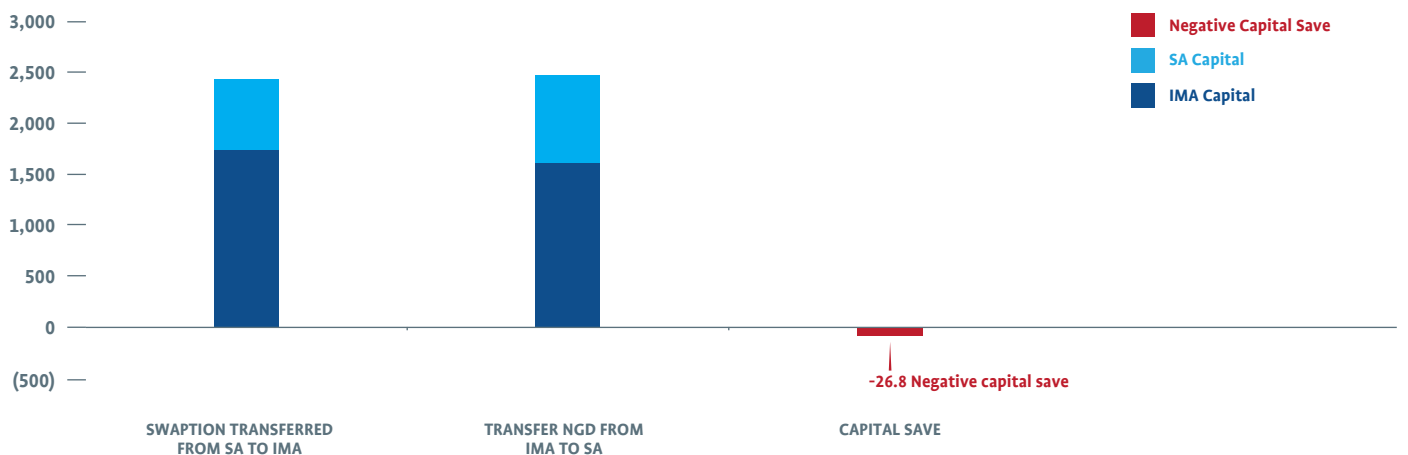
TRADING BOOK DESKS	INSTRUMENTS	IMA CHARGE	SA CHARGE	
DESKS UNDER IMA	IR Desk	3 Bond, 3 Swap, 1 Swaption	1,016,971.00	2,633,007.21
	EQ Desk	2 EQ, 1 EQ EuroOption	267,914.00	193,906.20
	Total IMA Desk	Mix	1,085,330.00	2,727,815.37
(THE REST) DESKS UNDER SA	FX Derivatives	1 FX Barrier Option	NA	430,532.27
	Total SA Desk	Mix	NA	430,532.27
TOTAL	All Desks	All	NA	2,796,738.41
TOTAL CAPITAL CHARGE				1,515,862.27

WHAT IF SCENARIO (Moving EQ: NGD.TO from IMA EQ Desk to SA EQ Desk)

TRADING BOOK DESKS	INSTRUMENTS	IMA CHARGE	SA CHARGE	
DESKS UNDER IMA	IR Desk	3 Bond, 3 Swap, 1 Swaption	1,016,971.00	2,633,007.21
	EQ Desk	1 EQ, 1 EQ EuroOption	44,055.00	119,895.55
	Total IMA Desk	Mix	1,006,281.00	2,975,568.39
(THE REST) DESKS UNDER SA	EQ Desk	1 EQ	NA	105,800.00
	FX Derivatives	1 FX Barrier Option	NA	430,532.27
	Total	Mix	NA	536,332.27
TOTAL	All Desks	All	NA	2,796,738.41
TOTAL CAPITAL CHARGE				1,542,613.27

THE DELTAS ARE SHOWN HERE

(In Thousands)



Once the size of the NGD position is scaled up by a factor of 10 and we conduct the same test (moving it from the IMA to SA desk), capital can be reduced 25% by transferring NGD from IMA to SA, consistent with our expectations. This time, NGD has a much larger exposure, so the capital savings in the position itself overwhelms the diversification effect.

BEFORE (Increase NGD.TO's notional by 10 times)

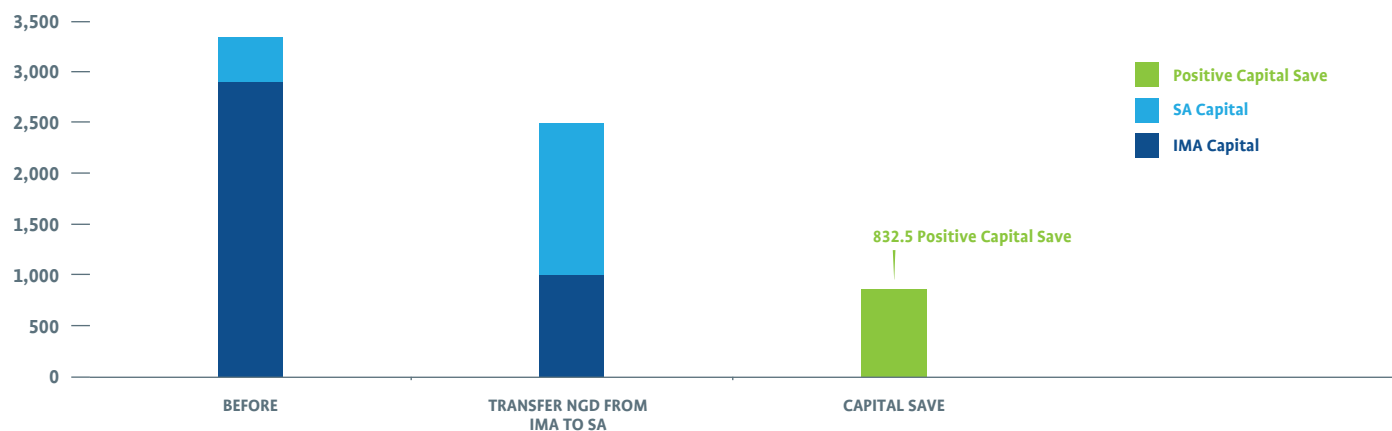
TRADING BOOK DESKS		INSTRUMENTS	IMA CHARGE	SA CHARGE
DESKS UNDER IMA	IR Desk	3 Bond, 3 Swap, 1 Swaption	1,016,971.00	2,633,007.21
	EQ Desk	2 EQ, 1 EQ EuroOption	2,531,405.00	1,138,899.21
	Total IMA Desk	Mix	2,896,805.00	3,994,572.05
(THE REST) DESKS UNDER SA	EQ Desk		NA	—
	FX Derivatives	1 FX Barrier Option	NA	430,532.27
	Total SA Desk	Mix	NA	430,532.27
TOTAL	All Desks	All	NA	—
TOTAL CAPITAL CHARGE				3,327,337.27

WHAT IF SCENARIO (Move EQ: NGD.TO from IMA EQ Desk to SA EQ Desk)

TRADING BOOK DESKS		INSTRUMENTS	IMA CHARGE	SA CHARGE
DESKS UNDER IMA	IR Desk	3 Bond, 3 Swap, 1 Swaption	1,016,971.00	2,633,007.21
	EQ Desk	1 EQ, 1 EQ EuroOption	44,070.00	105,800.00
	Total IMA Desk	Mix	1,006,296.00	2,727,815.37
(THE REST) DESKS UNDER SA	EQ Desk	1 EQ	NA	1,058,000.00
	FX Derivatives	1 FX Barrier Option	NA	430,532.27
	Total	Mix	NA	1,488,532.27
TOTAL	All Desks	All	NA	—
TOTAL CAPITAL CHARGE				2,494,828.27

THE DELTAS ARE SHOWN HERE

(In Thousands)



Summary

There are many considerations that will go into structuring desks in order to make efficient use of capital. Firms in the U.S. and Canada will use their post Volcker rule setup as a baseline. What will happen to the CVA desks? Currently CVA desks are centralized, however traded instruments will be split into SA and IMA components. The desk and CVA traders may need to be split up. Hedge positions may need to be consolidated with its offsetting positions under the same approach. In addition, certain structured and exotic deals might want to be put together with vanilla deals in order to fit within the tolerance to pass P&L attribution testing.

Finally, the process of capital optimization requires many hypothetical scenarios to be tested. It makes sense then, for firms to invest or acquire technology to help with business planning and continuous refinements of desk structure and asset mix post implementation.

REFERENCES

¹ Bank of International Settlements. Fundamental Review of the Trading Book – Interim Impact Analysis, November 2015.

² Bank of International Settlements. Minimum Capital Standards for Banks, January 2016.

WZ
D3XOH
cv1ge
AbAeTD
5u24AA
4nuWt
CiwEn2F
2sUiyYV
X2CLtAFv
mDQbL
mB66fqPG
knf3JVM7
BHlek6lhc
jnLbxdv8
gZLv3mnZ
nvVm