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FUNDAMENTAL REVIEW OF THE TRADING BOOK: MAKING THE MOST OF THE CHALLENGES FROM THE NEW MINIMUM REQUIREMENTS FOR MARKET RISK

EDITORIAL

Freddy Gielen
Executive Partner

Freddy Gielen is a Founding Partner of Avantage Reply. Freddy has over 20 years' experience in Prudential Risk, Finance and Regulation. Prior to establishing Avantage Reply in 2004, he has worked as a consultant for systemically important institutions, The World Bank and global financial regulators. He holds a Master's degree in Finance and in Engineering. He is also a Certified Public Accountant (U.S. CPA).

Email: f.gielen@reply.com

About **Avantage Reply**
Established in 2004, Avantage Reply (a member firm of Reply) is a pan-European specialised management consultancy delivering change initiatives in the areas of Compliance, Finance, Risk and treasury.

Website: www.avantagereply.com

After four years in development, encompassing three consultation documents and several quantitative impact studies, the Basel Committee on Banking Supervision published the long-awaited final text of the Fundamental Review of the Trading Book (FRTB) in January this year. Although discussions will continue with regulators to fine-tune the new rules, banks' focus is increasingly on implementation to meet the 1 January 2019 deadline for domestic legislation.

In this fourth edition of the CRO Insights Journal, we assess the challenges banks face in implementing the new minimum capital requirements for market risk through interviews with experts from HSBC, ING, Rabobank and Avantage Reply.

What emerges from the discussion is that any decision to implement an internal model will need to consider a complex balance between the costs and efforts involved, the possible capital impacts and the regulatory expectations. Yet banks must also grapple with the fact that the exact capital impact remains unknown given the uncertainties entailed by non-modellable risk factors (NMRFs), regulatory interpretation and the introduction of capital floors based on the standardised approach. To overcome these (potential) extra burdens imposed by FRTB, banks are exploring collaboration opportunities, particularly with regards to data requirements. Moreover, the many changes brought by FRTB must also be seen in the context of the Volcker rules and CVA capital requirements.

As Mark Penney, Head of Capital Management (Global Markets) at HSBC explains, FRTB requires a different way of looking at risk factors. He takes on the interrelationship between FRTB, Volcker and CVA capital requirements, how banks can optimise the construction of their desks, and the prospects of shared computation and data utility solutions.

Three of Avantage Reply's experts, Hadrien van der Vaeren, Gary Dunn and Ram Ananthapadmanaban articulate the difficulties they foresee with three of the most significant changes made by the reforms: the trading book/banking book boundary rules, the standardised approach and the internal model approach.

Finally, Freddy van Dijk, Head of Financial Markets Risk Methodology at Rabobank, and Thelma Stahlie, Head of Market Risk Management Bank Trading Consolidation at ING, share their insights in light of the Dutch experience of implementation so far.

Given the complexity of the rules and their potential capital impact, we are sure you will agree that there is much here for banks to weigh up. We hope that the contributions in this fourth edition of the CRO Insights Journal will prove to be both stimulating and useful to risk professionals in preparing for the challenges of implementing FRTB.

Freddy Gielen
Executive Partner
Avantage Reply

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CONTRIBUTORS

Mark Penney is the Head of Capital Management for Global Markets at HSBC, where he is responsible for managing all aspects of prudential regulatory change and capital optimisation. Mark previously worked at Hill Samuel, TSB and Barclays in a variety of roles. Starting as a Gilts analyst, he subsequently worked in a quantitative treasury role and in derivatives, before shifting to equity proprietary trading and then equity structuring and product development. Since joining HSBC, he has developed HSBC's equity derivative business and was subsequently responsible for balance sheet management. He moved to his current role in 2008. Mark has a degree in Mathematics and a doctorate in Mathematical Modelling.

Freddy van Dijk heads the Risk Management Financial Markets Advisory department and is responsible for the risk reporting, policies and methodology related to the financial markets business of Rabobank. After he received his Master in Econometrics at Tilburg University in 1999 he started his career at the risk management department of Rabobank International. He worked in pricing model validation, risk methodology (market risk and counterparty credit risk) and market risk management. Until mid 2014 he was heading the methodology team and responsible for the implementation of market risk and counterparty credit risk models, including the Internal Model Method for counterparty credit risk and the fundamental review of the trading book. Since mid 2014 his scope was broadened, to include market and counterparty credit risk reporting and policies.

Thelma Stahlie is the Head of FI/FM Portfolio Measurement and Analysis within ING Bank Credit & Trading Risk. She is responsible for the measurement, monitoring, analysis and reporting of the global consolidated market risk in the trading portfolios and of the CVA, counterparty and collateral exposures of the derivatives. Prior to joining ING in 2008, she gained experience in the area of market and counterparty credit risk management in various international banks in the Netherlands and Singapore, as well as in asset management and consultancy.

Ram Ananthapadmanaban is a Risk professional and Quantitative Analyst with over 10 years' experience working on critical risk initiatives within Global financial institutions. Ram has significant expertise in Credit Valuation Adjustment (CVA) capital modelling, market risk (including Basel 2.5 and Fundamental Review of the Trading Book), wholesale credit risk modelling (including requirements for IMM waiver extension), economic capital modelling (Pillar II framework), operational risk and model risk. He has a proven track record of delivery within risk and regulatory change initiatives covering systems integration, model development/validation, management reporting, process re-engineering and project management. Ram's quantitative skills span econometrics, risk modelling, derivatives pricing and computational finance.

Gary Dunn is a Senior Advisor at Avantage Reply. He started his career as a statistician and mathematician. Over the years, he has developed a good knowledge of markets through 15 years of successful trading and then subsequently moved on to risk modelling. He is a specialist in risk models for regulatory capital requirements with a special interest in the Fundamental Review of the Trading Book initiative. Gary also has excellent expertise in model validation and coordinating stress testing exercises. He has a perfect understanding of VaR modelling, calibration and IRC modelling and his specialities are quantitative analysis, economics, econometrics and financial markets.

Hadrien van der Vaeren is an experienced Manager with Avantage Reply, which he joined in 2014. He joined Avantage Reply Quantitative Risk Practice, focusing on the risk and capital modelling on both smaller scale implementations and on implementations of large and complex systems developed by dedicated IT teams. He has worked both on Pillar I and Pillar II modelling issues. Hadrien has five years' experience in Market Risk and Banking. Previously he worked at Dexia (later Belfius) in Belgium, within the team that developed and obtained regulatory approval for a new internal model for market risk. He has a strong understanding of market risk modelling and the implementation challenges that come with it.

The FRTB and its impact: Have the policy makers got it right?

Interview with

Mark Penney,
Head of Capital Management for Global Markets at HSBC

FRTB WILL REQUIRE BANKS TO THINK ABOUT RISK IN A DIFFERENT WAY. ITS IMPLEMENTATION RAISES A HOST OF ISSUES, FROM THE IMPACT ON TRADING DESKS TO THE VALUE OF SHARED UTILITY SOLUTIONS. MOST IMPORTANTLY, BANKS WILL HAVE TO ADDRESS THE COEXISTENCE OF FRTB AND VOLCKER. IN A WIDE-RANGING INTERVIEW, MARK PENNEY, HEAD OF CAPITAL MANAGEMENT AT HSBC, EXPLAINS HOW HSBC PLANS TO MEET THE CHALLENGE.

Do you expect the trading strategy of your bank to change because of FRTB? Are there activities you expect to exit from or move into?

FTRB is just one of many changes we are going through at the moment. Volcker, for instance, necessitates that desk positions are more aligned for relevant balance sheets with the client service that is being provided and the risk involved. That therefore already creates a segmentation of the trading businesses into units which are very risk controlled and subject to risk limits and a risk framework.

FRTB, however, requires a way of thinking about risk factors that is not necessarily identical to either the Volcker approach or a client service approach. Holding the same position in different desks may have a different regulatory outcome, either in terms of expense or by allowing a desk to stay within an internal model versus a standardised model. This raises the question of arbitrage: how do we optimise this when capital is a resource in short supply? I think it is probably more difficult than it might seem.

Superficially, the obvious answer is to try to do more trades in specific desks to flick the risk into books where the residual risk could be managed to provide a better outcome. To some extent that option is presented, insofar as multiple CVA (Credit Valuation Adjustment) desks are permitted. But the permissiveness that exists is really around taking only specific risk into a book, and only in certain instances – not a much more generic risk factor shift from book to book.

Furthermore, to the extent Volcker constrains a bank or a group, it reduces what flexibility you have with regard to FRTB. This makes optimising your position more awkward and difficult to effect in practice.

As for activities we might look to exit from or move into: for us, it is too early to say. The reason for that is that from the QISs (Quantitative Impact Studies) so far, it has not been entirely clear whether it is a specific activity, a specific risk factor, or indeed a combination of these that increases costs.

FRTB is more prescriptive on the definition of trading desks. How do you expect this to impact the organisational structure of the front office?

FRTB really consolidates aspects of Volcker regarding the need for good order in trading desks: the need for complete clarity, for no co-ownership of desks, so that there is a single line of responsibility for risk. That sits very well with a coherent approach to risk management with a coherent cascade of limits for the management and control of the risk. To this extent, the definition of trading desks is helpful.

However, there is a contradiction between the intended coherent approach to risk management and the use of a prescriptive list. A prescriptive list may require particular products or risk factors – the regulators have not made this clear yet - to be extracted. By arbitrarily extracting products, and therefore some risk factors from a Volcker book, you fundamentally distort the nature of the risk structure. You potentially force a separate risk structure to exist. In our view, that is not rational from a risk management perspective. I think if prescriptive lists are executed on by individual regulators, we might find that the definition of "book" and the way that those products are thought about has to be re-examined under Volcker as well.

Do you expect your organisation to apply for internal model approval? What are the reasons for applying or not applying for internal model approval?

Absolutely. Very simply, if the policy makers are right, and a standardised approach could result in approximately 40% higher capital requirement, banks cannot afford not to apply for internal model approval.

The caveat to that would be if the cost – of the system, development, and the ongoing management cost – was extreme. In fact, the detail and operational functionality required by the standardised model is not materially less than the modelled approach. There will be a high expense differential around Profit and Loss (P&L) attribution and backtesting, but not around the running of models. I think it is incoherent for any bank not to apply.

Do you have a more detailed view on the capital impact that FRTB will represent for your bank? Have you already started looking at the optimal desk structure?

As you indicate, the impact will depend on your book choice. We have assessed it, but are not yet in the position of having done lots of optimisations. For HSBC, market risk capital requirements are small compared to overall capital requirements: we are running about £45 billion RWAs (Risk-Weighted Assets) as against £1.28 trillion. However, although in this context it is a small number – 2-3% of our total – it would be wrong to say that if it doubles, it doesn't make a difference.

Regarding optimal desk structure, it is highly likely that we would want to keep, as far as possible, the risk structure that follows Volcker; albeit it is quite likely that we will want to use combined Volcker books rather than individual Volcker books.

An interesting aspect of the changes that were published in January was the reduction of the liquidity horizons and the inclusion of a multiplier for expected shortfalls, which have opposing effects

Yes, the inclusion of a multiplier is deliberately to offset the reduction of the liquidity horizons. However, I think that there is a difficulty with parts of the calibration.

The optimal position is where the regulatory capital follows the risk. That gives us a measure of control. However, where the calibration obviously starts to diverge from real risk, or where there is a "cliff" effect between things being in and out of models, that is a concern to us. As soon as there are odd drops or spikes in the number, doing something in a slightly different way completely changes the economics of the business. It becomes more difficult to offer clients the risk management facilities they need, which is, at the end of the day, our purpose. One of the key drivers of markets is to make sure we are in them, so that we know enough about the market, in order to hedge and to ensure that good liquidity is provided back to the clients.

How are you approaching the problem of efficient capital allocation across desks, based on multiple constraints including limits to hedging and diversification?

This is slightly tricky, because it goes to the core of whether you believe that capital is what actually matters here. For us, capital is only one of the considerations involved. We don't, in general, cascade capital down to the desks directly because capital isn't something that's usually understood on trading desks. Capital is a banking concept. Trading desks, historically, have understood buying and selling stuff. Clearly we are moving into a new world where traders do actually have to start to understand these concepts. However, the transferral of capital requirements into desks is awkward.

The danger is of penalising desks for things that are genuinely outside their control, and not as a result of risks, trading or client service that they've undertaken. If, for instance, a Profit and Loss (P&L) attribution test fails, it might be nothing to do with that desk and nothing they could have avoided. Furthermore, capital drivers are not the only consideration that can change the way the business operates: large exposures, leverage, stable funding requirements and structural changes to balance sheets are also relevant. So capital will not be the only control that is cascaded down to desk level – it will be a host of considerations. We have to consider these things at a high level – but it is a very serious omission not to tell a desk that required stable funding is important to them, too.

Would you agree that the rules are intended to drive the right behaviours within the front office? If you ensure that traders understand the strategic levers that they can pull to influence capital and the others metrics that you mentioned - does that allow you to better understand risk, at both the trading desk level and Group level?

I think we already understand risk well. You are right that it adds value, in terms of the way that risk and capital are thought about. But it is highly questionable that it adds net value. We didn't need a fundamental change in capital requirements to come up with a capital number that is about the same as it is now.

FRTB is highly prescriptive and some industry participants have suggested that shared tools could be developed, for example to compute capital requirements under standardised rules. What is your view on this trend? Are you participating in any such discussions?

The obvious solution, when presented with such a complex system with such massive programming and data requirements, and where you have zero differentiating factor, is utility computing. That is absolutely something we, and the industry as a whole, have been looking at. Such utility solutions often work better when they come from smaller groups of banks and are then taken on board by others. That's a path we're trying to follow as well.

However, the computational expense of these models is probably in the order of eight to fifteen times the current computational expense. Superficially, it seems like it ought to be materially cheaper to outsource those computational requirements. Actually, if all the banks are trying to use the same computing power, at the same time, in the same region it will be just as expensive. In other words, the benefit of running models together on the same platform doesn't really exist. You just need a bigger platform - more computing capacity - which will cost the same as if you did it yourself.

We are still exploring the issue, but it seems quite unlikely that the fully modelled approaches will be susceptible to utility solutions. Firstly, there is a difficulty in getting the data together to input it, which takes a lot of effort internally. Additionally, for both the internal model and standardised model you are potentially looking at the same risk factors, the same clustering by desk. You may therefore need, for optimisation purposes, to be able to flick between different combinations of desks that fall in and out of the models within the same system.

The avenue around which most opportunity lies is a data utility and solutions to manage big data. The market getting real prices, as they call them, which determines whether things become non-modelled risk factors or not, is something that is clearly very usable.

The other element is the way that data arising from P&L attribution is fed back and collated. That is a massive data retention issue. For P&L attribution, you need highly granular Profit and Loss data going back over a long period. Historically, many houses won't have collected that because it is terabytes of data. There is an opportunity here for utility solutions which

provide better, more efficient access to such massive data clusters, which allow you to extract and reuse it from central sources.

Big data is going to be very important. You mentioned earlier that internal models would be done in-house, but that banks need a solution to analyse and manage the amount of data gathered through backtesting. If you are collecting and storing vast volumes of data from desk level, there is a considerable data retention issue.

Yes, that is absolutely true. I identified very early on that I would ideally like to use that data to run hundreds of millions of optimisations in a variety of different areas – in fact, that is what led me to be the accountable executive for this particular program. However, I quickly realised that it was never going to be possible. We were, instead, going to have to do a lot of sieving and reducing of the problem to get something coherent.

How much of a challenge will it be to prove that a risk factor is modellable and how are you approaching data sourcing for non-modellable risk factors (NMRF)?

We have already spoken about the approach to data sourcing: the short answer is through the sharing of as much information as possible.

As to how much of a challenge it will be to prove that a risk factor is modellable: in some spaces, it is going to be quite difficult. If the Basel Committee retain the current definition of the criteria you can use, it becomes really, really difficult. Say you have a 15-year credit product. If you only have quotes for the 5 and 10-year CDS (Credit Default Swap), and those are the only real prices you have evidence of, and you can interpolate but cannot extrapolate – there is a huge problem. It means instantly that all of your book beyond the dates you've got become non-modellable, which makes your capital requirements go up. I think it will encourage the wrong behaviour. If you've got a 30 year book, someone will quote you a 31 year CDS, so that you are able to develop an internal model matching the Basel Committee definition. Now everything is interpolation – even though the price of the 31 year CDS was arrived at through extrapolation. The policy makers should instead encourage coherent, smooth, continuous modelling, and it should be relied in the way that we already do for pricing, valuation adjustments, and in another areas. That is the right way ahead.

The Basel Committee is also working on a new Regulatory CVA (Credit Valuation Adjustment) framework which is inspired by FRTB. Are you expecting more synergies between market risk and counterparty credit risk?

This requires thinking about the connectivity of risks. The danger is of treating matters orthogonally – that is, without taking into account the interaction between them. Such an approach might lead us to conclude, as regards liquidity for instance, that things are less liquid than they actually are, with a correspondingly enormous capital expense. My tendency is to wait until we can model all of this holistically.

As we discussed earlier, liquidity horizons have been changed in equity and credit. However, we still potentially have the wrong liquidity horizons in other areas. I would not accept that everything must have a minimum liquidity horizon of 20 days, for example. Many risk factors can be eliminated very quickly. Part of the problem is that the approach to liquidity horizons for an instrument, a position and a risk factor should be completely different, yet they have all been cascaded into the rule.

The proposed CVA framework is supposed to increase alignment between accounting CVA and regulatory CVA and to offer better recognition of hedges. Do you expect this to change how your bank manages CVA risk?

It would be great if accounting regulation and risk regulation could be aligned, but I think they are intended to do different things. Accounting CVA is really intended to fairly value instruments. Regulatory CVA is aimed at prudentially controlling risks. They don't have the same purpose. It would be beneficial, however, if the movements in accounting CVA were the amounts you would expect to put under regulatory CVA risk charges but that is not the case at the moment.

Another element, which is quite important in the European context, is the CVA exemption for companies. Consider a concrete company, for example, that raises money in dollars to

buy and build a European concrete factory and then does a cross-currency swap. The question is: could this cross-currency swap be cleared? The concrete factory still wouldn't have the cash to put as collateral. So the EMIR (European Market Infrastructure Regulation) quite reasonably exempts them from clearing requirements and, by reference to EMIR, they get exempted from the CVA charge. There is a good reason for this: if the company could not put up the necessary cash as collateral, they could not reduce their risk to the bank - but they should not be penalised for getting rid of this financial risk.

In our view, the companies and commercial customers need to be encouraged not to bear risks that they don't understand and to focus on the risks that are key to their business. You do not want a concrete company to be managing FX risk over 20 years. You want them to be able to transfer it out, and not to be burdened with enormous costs when they do so.

The Regulatory CVA proposals provide the choice of using a standardised approach or an internal model approach based on either accounting or IMM (Internal Model Method) credit exposure profiles. Will this provide capital optimisation opportunities and could it potentially compromise capital neutrality?

Yes. I don't think that institutions' CVA are the same, even for the same risks. And I think that, in part, is down to design. There are lots of differences between houses, and that means it is not a level playing field.

Something that we see regarding expected exposure profiles is that, from an accounting perspective, they may not apply the same assumptions around collateral haircuts or even variable margin period of risk, whereas in the IMM models they do. Am I right to say that you would see a divergence between those two, and that can drive your capital numbers?

Yes, it could do. But regulatory margin period of risk is not necessarily consistent with genuine margin period of risk – they have different purposes, and therefore different outcomes. The former is calculated to be prudent and conservative, not a fair value representation. This again has to do with the alignment of accounting CVA and regulatory CVA. Aligning as many of the bases as possible is a good idea, but you have to remember that their purpose is not the same. I think we are going to be stuck with the difference for a while.

IMPLEMENTATION OF THE FRTB IN THE NETHERLANDS

Interview with

Freddy van Dijk,
Head of Risk Management
Financial Markets Advisory
at Rabobank

Thelma Stahlie,
Head of FI/FM Portfolio
Measurement and Analysis
within ING Bank Credit &
Trading Risk

OSCAR MCCARTHY AND ARNOLD VELDHOEN FROM AVANTAGE REPLY NETHERLANDS MET FREDDY VAN DIJK (RABOBANK) AND THELMA STAHLIE (ING) FOR DINNER, WHERE THEY DISCUSSED THE NON-QUANTITATIVE ELEMENTS OF IMPLEMENTATION OF FRTB FOR BANKS IN THE NETHERLANDS. FREDDY AND THELMA ARE ACTIVE IN THE TRADING BOOK WORKING GROUP AT THE NVB (DUTCH BANKER'S ASSOCIATION) AND ACTIVELY ENGAGE WITH ISDA AND IIF ON THE MATTER.

What is the current focus of the major Dutch banks?

The major Dutch Banks are primarily focused on retail and commercial banking. The strategic focus within Financial Markets in these Banks is therefore aligned to client servicing for commercial banking clients, with limited directional trading. Key clients include local SMEs, large corporates, and the substantial Dutch pension fund sector. Dutch Banks are well advanced in internal modelling.

Key areas where work is underway include: programme mobilisation, building a standardised RWA calculator, and developing IT system and data readiness. Internal strategies for a number of other areas continues to be work in progress, with decision making partially dependent upon clarification from the regulator on certain points of detail.

Should we develop internal models under FRTB?

The decision whether or not to use internal models under FRTB is in principle optional: the Basel text does not mandate their use, although individual supervisors such as the ECB may well mandate their use for systemic FIs with large trading books. At present, Banks are reviewing their options and waiting to see what calibration formulae are proposed by the regulator. The expectation is that the capital formula will be something along the lines of:

K = max(Internal Model, x% * Standardised)

thus setting a capital floor at x% of standardised. But what will x be? If x is too high then there is limited incentive to sanction

the required investment in internal models. A low value of x is necessary to support the business case and increase use.

How should the bank organise the desk supervision?

A key change introduced by FRTB is the move from firm-level supervision to desk-level supervision. All Banks – irrespective of whether or not they elect to use internal models – will be required to propose a desk structure. Each desk will rapidly acquire a substantial library of documentation, relating to inter alia the desk's mandate, trading strategy and risk/financial monitoring.

A question that Banks are currently studying is how they should organise their desks. This gives rise to an optimisation problem: too many desks, and there is a large increase in operational expense; too few desks, and the "cliff effect" of model rejection for a named desk increases. Hence a capital efficient Bank with internal model ambitions may seek to optimise the capital outcomes through effective capital allocation algorithms, whilst adhering to Basel requirements for desk structures.

Some Banks are seeking synergy with the Volcker Rule. This alignment can in principle ease the operational implementation of FRTB. It remains to be seen if this is the most capital efficient setup.

A key concern that Banks have expressed is the complexity of regulatory approval. Given that FRTB moves the focus from firm exposure to desk exposure, it follows that each bank will require model approval for each desk. This suggests that many Banks will ultimately need to make an application with 20-50 desk requests; a non-trivial task. This means that a Banking supervisor such as the ECB (which supervises 130 Banks) can potentially expect to receive 5,000 desk requests! – a number which is likely to overwhelm the capacity of the supervisor.

According to the FRTB text, the transposition into national legislation is expected to be complete by the end of 2018, to allow for full implementation – including (where applicable) model approval – by the end of 2019. This is an extremely challenging schedule – and some would say impossible. Given the need for a model application to conform to the details of national (or European) legislation, a Bank would not be able to complete an internal model application until months after the publication of the legislation, leaving very little time for supervisory review of the resulting model applications. This suggests that – absent a change in schedule – that there is a risk that there may be a period in which the (new) Standardised Approach is used in full for many Banks, pending model and desk approvals.

Once there is greater clarity regarding the ECB's schedule for the management of internal model applications, Banks are expected to accelerate their work towards the first window of opportunity. This potentially means prioritising certain desks, with simple 'vanilla' products placed in the first wave of applications. Trading strategies with non-modellable risk factors could be moved tactically onto a separate desk, to make sure that they do not prevent the remaining products from achieving approval..

What about data?

A key property of a non-modellable risk is the lack of data history. 24 annual observations, not more than a month apart, are required: a rule which may create practical difficulties in key vacation periods, such as Christmas and summer. One possible mitigant is the increased use of shared data, perhaps with additional transactions amongst market participants to support the process. This solution has certain attractions, inasmuch as it potentially reduces the number of non-modellable risk factors, but risk managers remain cautious: such a system would require appropriately robust governance to be of value in an FRTB environment.

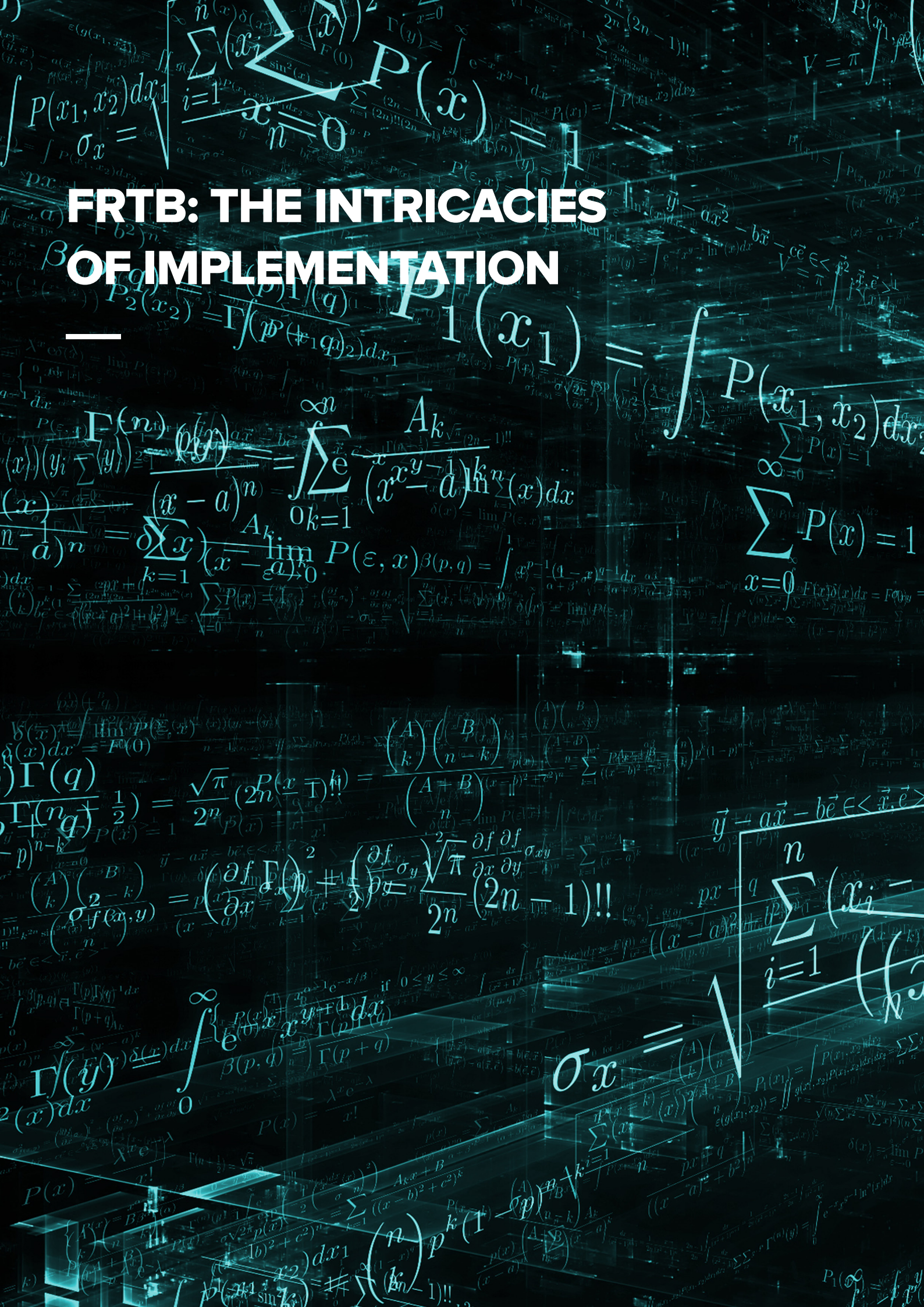
In Summary, what are the most important considerations for banks?

- Internal models – is it worth the cost and effort? – the business case remains to be proven. The final calibrations will determine many model decisions.
- It will be very hard to choose the optimal desk structure, so many banks will keep their existing book structure and only make small amendments, i.e. ensuring that the large important trading desks don't lose IMA approval due to certain NMRFs by moving these NMRFs to non-IMA desks.

- Data - Many of the requirements (for example, the need for 10 year history) will be extremely problematic for certain product types, especially in various emerging markets. Proposals for industry data pooling were cautiously welcomed, however strong governance will be required in order for this to be a viable solution.
- Many items are unclear (for example floor, parameter calibration, P&L definitions); this means that it is difficult to make the business case where deadlines are getting very close, given the long approval period.

Planning for FRTB implementation is firmly underway in the Netherlands. However, the key dependency for many remains the lack of clarity regarding the calibration of the standardised floor, as well as the complexity and workload required for an application for use of internal models. The FRTB programme of banks increasingly has to compete for scarce resources with the likes of EMIR, Mifid II, IFRS9, Anacredit, balance sheet restructures and a host of other change initiatives.

FRTB: THE INTRICACIES OF IMPLEMENTATION



Interview with

Ram Ananthapadmanaban,
Head of quantitative
practice at Avantage Reply

Gary Dunn,
Senior Advisor at
Avantage Reply

Hadrien van der Vaeren,
Manager at Avantage Reply

IN JANUARY 2016 THE BASEL COMMITTEE PUBLISHED ITS FINAL UPDATE ON THE REVISED STANDARDS FOR MINIMUM CAPITAL REQUIREMENT RULES FOR MARKET RISK. WITH BANKS REQUIRED TO IMPLEMENT THE NEW STANDARDS BY JANUARY 2019, THEY MUST NOW LOOK AHEAD TO THE MANY CHALLENGES IMPLEMENTING FRTB WILL BRING. THREE OF REPLY'S EXPERTS, RAM ANANTHAPADMANABAN, GARY DUNN, AND HADRIEN VAN DER VAEREN, EXCHANGE THEIR VIEWS ON THE MOST IMPORTANT ELEMENTS OF THE REFORMS, HIGHLIGHTING CRUCIAL ISSUES IN THREE KEY AREAS: THE TRADING BOOK/BANKING BOOK BOUNDARY, THE STANDARDISED APPROACH, AND THE INTERNAL MODEL APPROACH.

Delineating the trading/banking book boundary

Ram Ananthapadmanaban:
The trading book/banking book boundary rules are a good place to start in reviewing the many changes FRTB will bring. Their purpose is to allocate products to the prudential capital regime – that is, the trading book or banking book rules – which will provide the most appropriate capital charge. They are therefore key to the design of other aspects of FRTB, including risk measurement.

Since the current rules have been greatly criticised, devising a new approach to the boundary rules has been of considerable importance to the Basel Committee.

One of their primary concerns is the amount of regulatory capital arbitrage between the trading book and banking book. The Basel Committee has therefore tried to adopt a clearer definition of the trading book, with a stricter set of rules as to what belongs in each book. The revised boundary rules use a presumptive list, while at the same time retaining an intention-based approach. The FRTB also clarifies that instruments must be fair valued and that moving products from one book to another can only be done in exceptional circumstances. Moreover, doing so will result in a pillar 1 capital add-on, so that there is an element of equalisation between the trading book and banking book.

To implement these new rules, banks must first consider the definition of their trading desks. They must flag up what exactly constitutes their trading book and make clear which trades have boundary issues. Furthermore, banks should aim to be able to evidence compliance with FRTB, including trading desk definition, in a way that allows full traceability from the rules. This will not only help satisfy the regulator and inernal audit but will also assist their own internal audit functions.

One aspect of the boundary rules that will particularly require banks' attention is internal risk transfers. For example, a bank may be using trading book positions but hedging banking book positions, such as where it has a set of swaps that are hedging a mortgage book. The rules allow some relief in those circumstances. But the bank must clearly delineate what its hedge and its underlying position are, and pay careful attention to the general interest rate risk portion. That is also the case for credit risk and equity risk.

Internal risk transfer: management and possible regulatory gaps?

Hadrien van der Vaeren:
Internal risk transfer is a topic that lies between risk, treasury, and finance. Which of those areas do you see as most appropriate for managing it?

Ram Ananthapadmanaban:
It will depend on the financial institution in question. A bank with a substantial banking book and a very small trading book will have treasury involved in the management of behaviour risks within the bank. If, for example, that bank had a whole portfolio of mortgages and those mortgages had prepayment risk and pipeline risk associated with them, the bank may take on a set of swaps to hedge out those behavioural risks. In that scenario, treasury are well placed to handle the internal risk transfers piece.

By contrast, banks with a very small banking book and a much larger trading book will want to have finance more involved, with inputs from risk. Treasury will be less involved, as there is a behavioural component associated with finance and risk.

Gary Dunn:
There are difficulties here as regards internal risk transfers of interest rate risk. For credit and equity, a bank must do back-to-back trades. That is, going from the banking book to the trading book, the bank must make a corresponding trade with an external counterparty that matches the hedge.

For interest rate risk, however, it is rather different. No back-to-back trade is required. Rather, the banking book transfers the interest rate risk to a dedicated desk in the trading book. This ensures that the risk is not mixed with the rest of the interest risk in the trading book. However, the rules allow dedicated desks to trade externally. This can result in the risk being mixed after all. For example, the trading desk can do a trade with an external counterparty, which then transfers that risk back to the dedicated desk through a second trade. The risk therefore gets transferred from the independent part of the trading book to the dedicated hedge book.

There are no restrictions on what a dedicated desk can do. It does not have to be restricted to just hedging trades on the risk it is taking on the banking book. In fact, you might find that the bulk of a bank's business is done through such desks. The dedicated desk will take the bulk of the risk in the trading book, and banks could simply have a token "other" book just to satisfy the rules. To me, the rules as currently written are not going to work.

Initial set-up vs ongoing cost

Hadrien van der Vaeren:
It seems that defining the trading book/banking book boundary will mainly be problematic during the initial implementation. In running the bank process, however, there should not be too much work. Are there any other areas, besides internal risk transfer situations, which will require banks to actively work on them once FRTB has been implemented?

Ram Ananthapadmanaban:
Once a bank has set up its systems, policies and procedures around the treatment of its trades, it must ensure that its approach to market risk is feeding through into counterparty risk. This will impact its CVA, interact with the exposure calculation engines (as that ultimately deals with trade populations), influence the treatment of netting sets and so on.

So it is quite clear that the bank must pay a lot of attention to the initial set up, and have very clear policies and procedures that are documented.

After it has implemented these rules, it is prudent for a bank to test functionality and to ensure that staff are clear on the series of steps required to flag a trade as belonging to the banking or trading book. Additionally, it will require a mechanism for boundary cases to be reported and dealt with, especially if they are not flagged correctly. So there must be a very good exceptions reporting process as well.

A more risk-sensitive standardised approach

Hadrien van der Vaeren:
Of course, banks will also have much to do in implementing the new standardised approach which is intended to be more risk-sensitive. As we know, it is mandatory to perform standardized calculations for the purposes of disclosure.
When assessing implementation, it is of the utmost importance that banks know what products they will cover in their trading activity. They must also have computed risk sensitivities and have some idea of the trading book/ banking book boundary, although that can be finished later on.

Before beginning the computation of sensitivities, it is essential that banks classify all of their positions, and do so on an automated basis. They must know which risk measure to apply: Delta, Curvature, Vega, Default Risk Charge (DRC) or Residual Risk Add-On (RRAO). They must also define the risk class, whether it is General Interest Rate Risk (GIIR) or one of the types of spread risk, and identify the risk factor, although that should be more trivial. Defining the buckets, which are prescribed by regulation, may sometimes be more challenging to implement. For multi-underlying products, identifying the buckets of the risk factors and the risk classes is even more complex.

The computation of sensitivities should not be very challenging for most banks. In fact, the requirement to compute the full revaluation for the curvature risk may be more work. The issue there is that the bank first needs to feed in the size of the shocks, which is in turn determined by the classification of its position. There is some feedback between the two factors. This is the area in which most day-to-day operational issues will arise.

Another complex topic is the RRAO. How it is managed and computed will evolve over time. Next is DRC, which has a clear link with Counterparty Credit Risk (CCR) because it requires Loss Given Default (LGDs) and notionals.

My view is that classifying your positions is the most important thing. Once you have done that, and you know what you are going to compute, I do not think the aggregation will be very complex.

Gary Dunn:
Implementing FRTB will not be technically difficult but it could be very punitive from a capital requirements point of view. The RRAO, in particular, will significantly contribute to the capital charge.

The interest rate issues are a bit more work simply because of the number of buckets, as well as some computation issues. Parts of the rules are unsatisfactory. The industry's complaint is that some of the shocks are very large and may cause issues for full revaluation for curvature and also lead to punitive capital charges.

Hadrien van der Vaeren:
There will be maintenance work on the RRAO and on the full revaluation. Formerly, most banks had mostly analysts for their internal model. With full reavluation, additional analysts are needed to analyse results and deal with computational issues of the standardised approach. If a shock puts a bank into strong negative interest rates, prices are likely to react badly. The bank will want to clean that out before aggregating the results. There is therefore also a challenge of redefining resources, because a full revaluation is, by definition, not something you can fully automate and let run by itself.

Ram Ananthapadmanaban:
Full revaluation will certainly require many checks and balances to be put in place. Where there are valuation functions for different products, banks will have to be

quite clear in terms of what non-linear risks are actually being captured, in terms of gamma, cross-gamma, speed, and so on. Even though it is a standardised capital charge the complexity is considerable.

In terms of shock definition, there may be some very interesting behaviours in the non-linear components. Some of them can be very punitive and increase the risk quite substantially. Reporting of exceptions is necessary so as to pick out irregular behaviours in the valuation functions. As you said, dedicated teams will be required.

Too onerous for small banks?

Gary Dunn:
For small banks with just a handful of positions, putting all that in place may be very expensive. Some of them may not actually have price models for products. Yet the regulator's response seems to be that if a bank does not have a price model, it should go for an internal model instead, or should not be trading those products. But it is often not practical for small banks to go to an internal model, as the requirements may be disproportionate to the risks they are running.

There is a materiality threshold below which a bank does not have to have a trading book and can instead capitalise everything under the credit risk rules. However, many banks will not fall under the threshold and so will be in the circumstances I describe. There has been some discussion about retaining the existing standard rules for small banks. I think that would be welcome.

The rules are useful for benchmarking internal models and as a fall back when internal models fail for large banks. For small banks, however, there is probably just too much investment required.

Hadrien van der Vaeren:
Many agree that it has become overly complex for small players on the market. It goes against the initial objective of a level playing field.

Ram Ananthapadmanaban:
One of the areas in which all banks, large and small, can make improvements is the calculation of sensitivities. The rules are not particularly prescriptive in that regard. Two types of calculation methods are used at the moment: finite difference methods and Adjoined Algorithmic Differentiation (AAD). The latter is regarded as being substantially faster. Improvements in the calculation of sensitivities, once fed into the standardised calculation, can result in substantial capital benefits. So it is worthwhile for banks to do an impact analysis on the calculation method for the sensitivities, to see if there are any optimisation opportunities.

IMA: costs and unknowns

Gary Dunn:
To go back to the internal model approach (IMA), some large banks with VaR (Value at Risk) approval may feel obliged by the regulator to implement such an approach. Unlike the standard rules, however, IMA is optional, and banks might wish to consider a few points before deciding whether they want to implement an internal model. The investment is considerable, and the capital benefits could be much less than in the past.

Banks should compare the potential capital benefits of an internal model versus the standard approach. This can be difficult as there are several unknowns: most significantly, the impact of capital floors based on the sensitivities-based approach (SBA) and the impact of non-modellable risk factors (NMRF).

We expect there to be floors on internal models based on the sensitivities-based approach. There is also the possibility of an overall capital floor that is not specific to market risk, but based on operational risk and credit risk as well. We are still waiting to find out what percentage of the standard rules number will be applied as a floor for the internal model.

But, in my view, the unknown which could be the biggest problem with the internal model is the treatment of NMRFs. The work done by the industry shows that the NMRF capital charges in some asset classes can amount to around 30% of the market risk capital requirements. If the charges are that large, there is no case for maintaining an internal model for those asset classes.

Banks must also weigh up any possible capital benefits against the additional costs of implementing an internal model: especially additional IT requirements, but also stress testing, reviewing stale trades and proving the data they are using for observing risk factors meets the standards required.

Banks with an existing VaR framework will have lower implementation costs as they will already have many of these controls in place, although they will need enhancing. They may nevertheless still find that their capital savings are less than under Basel 2.5 and so decide against an internal model. On the other hand, even for a bank without VaR, the capital requirements under the new SBA may be so much greater that the investment is worth it.

When assessing all of the issues I have just described, banks can look at their existing VaR at desk level and their P&L attribution. Their current P&L attribution reconciliation will assist in assessing the prospect of meeting the FRTB's P&L attribution requirements, and the data from risk P&L versus front office P&L will enable them to derive some of the variance ratio and mean thresholds required. All of this will assist banks in deciding if an internal model is desirable before they even have to take steps to develop the model itself.

In summary, although we do not yet know what the capital savings will be, we do know that for some banks the implementation cost will be very high and that assessing whether they want to apply for an internal model approach will require a lot of work. And, of course, since the standard rules are so much more complex now they might be sufficient for banks anyway.

Careful desk design

Hadrien van der Vaeren:
If a bank has already complied with the standardised rules, how much of the work is already done? The bank will have set up the computation for a full revaluation and the sensitivities. The internal model does not even require a full revaluation. It is more difficult to pass P&L attribution and back-testing without one, but there is no specific requirement to do everything, even under full revaluation.

Gary Dunn:
Yes, the requirement for full revaluation was removed. However, in the UK at least, the Prudential Regulation Authority (PRA) put a lot of pressure on banks to do full revaluation anyway, even under existing VaR and Basel 2.5. So I expect they will still be required to do one.

Now if a bank decides to apply for internal model approval for an asset class, the next step is to carefully consider the construction of its desks. Most importantly, desks dealing primarily in NMRFs must be separated from those dealing primarily in risk factors that will pass the requirements for internal model approval. To do this, a bank will again look at its existing VaR arrangement, computing the expected shortfall from the VaR/P&L scenario it already has, the materiality of the capital savings, and how its back-testing will work. Notably, desks which do not satisfy all the requirements can be deemed sub-desks, and will operate under the standard rules. When banks proceed to distribute capital across desks in an optimal way, some desks may be closed.

The remaining issues are largely technical and concern liquid risk factors. Banks will need to assign risk factors to liquidity buckets and compute 10 day P&L vectors and scaled Expected Shortfall (ES) based on the prescribed cascade rules. This will leverage banks' existing VaR engines, as computing ES instead of VaR is a fairly trivial change. Of course, banks will need to retain the capability of computing 1-day VaR as well for back-testing.

Banks also must compute a stress file based on scenarios going back to 2007. They will want to construct desks that include risk factors with long histories. An important issue is the number of risk factors which banks use. Banks will aim to keep the reduced set of risk factors as large as possible. Indeed, some banks will try to use a complete set of risk factors as they do now for stressed VaR. That is because it will reduce the number of calculations, as it will not be necessary to repeat the calculations for the reduced factors of expected shortfall and current expected shortfall. They will simply do one calculation based on a full set of risk factors, all the way back to 2007.

Internal model v. standard model – cherry-picking?

Hadrien van der Vaeren:
Going for a whole set of risk factors rather than a reduced set could simplify matters. However, banks will need to carefully pick the desks that are to seek internal model approval, and the trades they put into those desks to get full histories. In the past, we used to have the problem of banks "cherry picking" between the trading book and banking book. Now it seems banks will "cherry pick" between internal model and standard model trading books, which they could not do before.

Gary Dunn:
"Cherry picking" between the standard model and internal model is more valid than "cherry picking" between the trading book and banking book. During the financial crisis, banks sometimes moved things from the trading book to the banking book simply because they did not like the mark to market. Occasionally they had assets in the banking book when really they were cross-trading them. There were liberties taken. It was against the rules.

The "cherry-picking" between the internal model and standard model approaches is different. The regulators want banks to use models where it is appropriate to do so: where there is good quality data and with respect to the liquidity horizons. If, conversely, a bank decides to use a model without the requisite data, the effect of including non-modellable risk factors will be too severe. In such a case, it is absolutely right to use the standard rules rather than take an internal model approach. So, rather than "cherry-picking", this can be presented as an honest, defensible analysis of what can be modelled and what cannot.

Hadrien van der Vaeren:
It seems, however, that it will be possible for banks to exploit the choice of models. I am not quite sure how yet. One could envisage, for example, a bank putting swaps specifically into a standard model desk because putting them in an internal model desk would result in a bigger capital hit. The bank could then actively trade the risk back to the desk it wants.

Gary Dunn:
Banks certainly will do that sort of thing, and why not? The rules are quite penal. We should also be helping banks to implement these rules in as sensibly so that they result in reasonable capital charges.

Hadrien van der Vaeren:
Yes. At the end of the day, banks are accountable to their shareholders too.

Gary Dunn:
Switching between models is also an issue in terms of capital optimisation. Banks will want to avoid the possibility of switching between an internal model and the standard rules. If that happens too frequently, the bank might prefer simply to keep failing the requirements and stick to the standard rules. It could then correspondingly increase its charge to clients.

Having said that, it is interesting to consider when a bank might have its waiver removed. Reading the rules, it seems that banks will not have their waiver removed in totality. Rather, it will be removed at desk level, desk by desk, when these exceed certain thresholds. But by that stage, you are left with a sub-set of desks that perform well, so the bank will likely be fine again at bank level.

Ram Ananthapadmanaban:
It is noteworthy that the internal model approach will require banks to have a very strong model-management framework. Thinking of the whole model lifecycle, from data all the way through to risk appetite definition, monitoring, reporting and back-testing to the use of early warning indicators, they will clearly need to have significant governance and support infrastructure in place to maintain internal model approval.

A related area which this will impact is deal assessment and pricing. Obviously many desks are now looking very carefully at XVA (various valuation adjustments) and, increasingly, capital valuation adjustment (KVA). Increased capital volatility will feed into banks' pricing as they assess the deal over the life of the transaction. And there may be cliff-edge effects where there is a switch from an internal model to the standardised rules during a deal. Any resultant distortions could destabilise certain markets. That is why using early warning indicators is so important. It allows a bank to provide stable pricing to its end clients.

Conclusion

Hadrien van der Vaeren:

There has been some interesting discussion. It is clear that, from the classification of their positions for the standard approach, to the careful construction of any desks that a bank puts forward for internal model approval, to the robust systems banks will need to maintain in order to clearly delineate the trading book/banking book boundary, banks face many challenges. Ultimately, the potential increase in capital requirements and the consequent increased cost of trading could be considerable. The sooner they understand the impact FRTB will have on their businesses, the better prepared they will be.

CONTACTS

Avantage Reply (Amsterdam)

The Atrium | Strawinskylaan 3051
1077 ZX Amsterdam
Netherlands
Tel: +31 (0) 20 301 2123
E-mail: avantage@reply.com

Avantage Reply (Brussels)

5, rue du Congrès/Congresstraat
1000 Brussels
Belgium
Tel: +32 (0) 2 88 00 32 0
E-mail: avantage@reply.com

Avantage Reply (London)

38 Grosvenor Gardens
London SW1W 0EB
United Kingdom
Tel: +44 (0) 207 730 6000
E-mail: avantage@reply.com

Avantage Reply (Luxembourg)

46A, avenue J.F. Kennedy
1855 Luxembourg
Luxembourg
Tel: +352 26 00 52 64
E-mail: avantage@reply.com

Avantage Reply (Milan)

Via Castellanza, 11
20151 Milano
Italy
Tel: +39 02 535761
E-mail: avantage@reply.it

Avantage Reply (Paris)

3 Rue du Faubourg Saint Honoré
75008 Paris
France
Tel: +33 (0) 1 71 24 12 25
E-mail: avantage@reply.com

Avantage Reply (Rome)

V.le Regina Margherita, 8
00198 Roma
Italy
Tel: +39 06 844341
E-mail: avantage@reply.it

Avantage Reply (Turin)

Via Cardinale Massaia, 83
10147 Torino
Italy
Tel: +39 011 29101
E-mail: avantage@reply.it

Xuccess Reply (Berlin)

Mauerstrasse 79
10117 Berlin
Germany
Tel: +49 (30) 443 232-80
E-mails: xuccess@reply.de

Xuccess Reply (Frankfurt)

Hahnstrasse 68-70
60528 Frankfurt am Main
Germany
Tel: +49 (0) 69 669 643-25
E-mail: xuccess@reply.de

Xuccess Reply (Hamburg)

Brook 1
20457 Hamburg
Germany
Tel: +49 (40) 890 0988-0
E-mail: xuccess@reply.de

Xuccess Reply (Munich)

Arnulfstrasse 27
80335 München
Germany
Tel: +49 (0) 89 - 411142-0
E-mail: xuccess@reply.de

Visit Avantage Reply's LinkedIn page

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