



## TO FRTB AND BEYOND

REGULATORY PERSPECTIVES By **Sanjay Sharma, Ph.D. – Chairman, GreenPoint Financial**

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In January 2016, BCBS released revised minimum capital requirements for market risk following their eight-year long Fundamental Review of the Trading Book (FRTB). This framework represents an overarching view of how risks from banks' trading activities and portfolios should be assessed and quantified through a credible and intuitive relationship with capital requirements. Principal components of the new guidelines include: a clear and impermeable boundary between banking and trading books; replacement of VaR by expected shortfall as a risk measure; revised sensitivity-based standardized approach; and revised expected shortfall-based internal model approach with differentiated liquidity horizons. The principal objectives of BCBS for FRTB are: 1) to achieve consistency across jurisdictions, 2) for its standardized approach to serve as a credible fallback and a floor to the internal model approach, and 3) to address existing weaknesses in the current internal model approach, with the overarching motivation to not significantly increase bank capital requirements.

Adoption of FRTB standards will require substantial overhaul of banks' risk analytics frameworks and processes including model selection, validation, and computation of parameters. FRTB will also have far ranging implications on how trading books will be organized, capitalized, managed, and regulated. FRTB is required to be implemented by year-end 2018.

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The FRTB framework replaces Basel II.5,<sup>1</sup> which was viewed from the outset as a stop-gap, post-crises measure. FRTB draws heavily on lessons learned from unobserved risk build-up leading up to the 2008 financial crisis and addresses the following inadequacies and inconsistencies of Basel II.5 and other related standards. BCBS

states that “[s]ignificant weakness in the Basel capital framework for trading activities resulted in materially undercapitalized trading book exposures prior to the 2007-08 period of financial crises.”

Initial estimates suggest that the increase in capital charge for banks’ trading books from FRTB adoption will be in the range of 40%<sup>2</sup> higher than current Basel II.5 capital requirements for trading desks/banks. Further, banks adopting the standardized approach are expected to experience capital charges 40% higher than for desks/banks adopting IMA.<sup>3</sup> The sheer increase in capital charge has attracted the attention of bank senior managements. Further, the wide gap between the standardized and internal model approaches will set the stage for competitive rebalancing across the industry.

FRTB rules and guidelines allow for banks to use the internal model approach at a desk level (as opposed to at a business or institution level in existing rules). This flexibility in selecting between the two approaches allows managements to be selective in investing in risk and analytics frameworks and allocating capital. Furthermore, this selectivity will allow capital markets managements to have flexibility in organizing trading desk structures towards optimizing capital deployment.

FRTB will reward availability and consistency of market data as well as integrated and robust analytics frameworks. A case in point is that regulatory approval for adoption of the internal model approach will require banks to demonstrate operational capability to be able to run the analytic frameworks on a regular basis.

Beyond the impact on capital changes, FRTB regulations appear to be prodding senior and functional managements to review their existing data, risk analytics and technology frameworks and to assess their capabilities for supporting manifold increases in the need for computational capacities across front office, risk, finance and operations.

In initial quantitative impact studies, banks have reported wide variations in the impact of FRTB on their capital charges. Two inferences can be drawn from the stunning diversity of reported impact. First is that the banks’ trading portfolios are so diverse in their underlying risk profiles that

the impact of FRTB rules on capital charges are substantially diverse. This should alarm regulators. The alternative inference, on the other hand, should be equally alarming in that banks have not understood the FRTB methodologies correctly or have used error-prone data or analytics. This should be alarming for both regulators and senior managements.

Regulators should be concerned about under-computation of capital charge, and vice versa for traders, desk and business heads, and senior bank managements. Regulators may well question overcapitalization of trading desks, but anecdotal evidence of regulatory scrutiny of overcapitalized desks or banks is rare unless these desks or banks have demonstrated excessive risk-taking. A logical response to this phenomenon is for both regulators and managements to ask for benchmarking of models and computation methodologies and “challenger” environments.

For the blessedly FRTB-uninitiated we provide a brief overview of FRTB and then move on to tackle the challenges and opportunities.

- **What are the key elements of FRTB ?**

- 1. Revised, stricter boundary between the trading book and banking book.**

This creates a less permeable and more objective definition that is aligned with banks’ risk management practices, and reduces the incentives for regulatory arbitrage. FRTB provides explicit definitions of trading instruments and Regulatory Trading Desks (RTD) and prescribes an extensive list of instruments presumed to be in the trading book with requirements for explicit approval from its supervisor for any deviation from this list.

- 2. Restriction on movement between books**

FRTB sets strict limits on the movement of instruments between banking book and trading book. In the rare instance that a transfer is allowed, disclosed Pillar 1 capital charges will be recorded.

- 3. Enhanced supervisory powers and reporting requirements**

Supervisors will now have discretion to initiate a switch in instruments between books if deemed improperly designated. Banks will also be required to provide enhanced reporting, evaluation and monitoring of boundary

determination and compliance including inventory ageing, daily limits, intraday limits and assessments of market liquidity.

#### **4. Standardization of risk transfer treatment across the boundary**

Limits and regulatory capital protocols are introduced on the internal risk transfer of equity and interest rate risk from banking books to trading books. This aligns with protocols already in existence for the transference of credit risk across the boundary.

#### **5. Choice between standardized and internal model approach at the trading desk level**

FRTB provides more flexibility for the banks to choose between Standardized Approach (SA) and Internal Model Approach (IMA) for capital charge computation at the RTD level. This is a very significant shift from prior environments where this choice was generally made at the bank level.

#### **6. Change in principal risk parameter from VaR to expected shortfall**

FRTB framework shifts the basic risk parameter from VaR to expected shortfall (ES) to better capture tail risk, and calibrated over a period of financial stress.

#### **7. Differentiated treatment of liquidity factors**

FRTB Incorporates the risk of market illiquidity by introducing "liquidity horizons" in the market risk metric, and an additional charge for trading desks with exposure to illiquid, complex products.

#### **8. Revised standardized approach**

FRTB standardized approach framework is sufficiently risk-sensitive to act as a credible fallback to internal models, and is still appropriate for banks that do not require sophisticated measurement of market risk.

#### **9. Revised internal model approach**

FRTB's internal model framework includes a more rigorous model approval process and more consistent identification and capitalization of material risk factors. This is designed to capture tail and liquidity risks and to improve model granularity by driving approval of internal models down to the trading desk levels. Hedging and diversification benefits will be recognized only when there is empirical

evidence that they are effective during periods of stress.

#### **10. Closer alignment between the trading book and the banking book**

FRTB's treatment of credit risk involves a differential approach to securitization and non-securitization exposures.

- **What is the relative attractiveness of SA vs. IMA?**

SA methodology under Basel II was considered to be coarse and conservative. It applied a significant capital charge premium for the uncertainty of partial risk capture. This premium should be lower for FRTB SA because it is sensitivity based.

SA is a reasonable sensitivity-based methodology. It provides a robust view of aggregate risks across all asset classes. The sensitivity-based approach also removes the perception that the computation framework is not sophisticated enough. This is a change from the SA methodology under Basel II and its iterations, which was viewed as rudimentary and coarse.

The incremental cost of adopting and implementing IMA should be justified through the reduction in capital charge and effective risk and capital management. Costs should also include the uncertainty of failing the P&L attribution test for IMA and falling into SA, with a consequent cliff of higher capital charge.

For banks that adopt the IMA, the differences in capital charges will likely attract higher funding costs if market participants form a skeptical view of the veracity of a bank's IMA framework. Banks that already have IMA will find the choice of adapting SA challenging because of higher capital charges and lower returns.

Banks that are currently under SA will find the choice of adapting to IMA on a desk level to be a potentially viable enhancement towards their competitive position. The possibility of individual desk level approval under FRTB creates the potential for banks that currently have SA to level the playing field from a capital charge perspective. If they are able to obtain IMA approval and a lower capital charge, these formerly SA-only banks could focus additional client relationships which had been previously

attainable. This is particularly true in “flow” desks in which robust market data is available.

As of this writing the floor level for SA has not been determined by BCBS. Because the SA approach under FRTB is significantly more risk-sensitive compared to previous BCBS methodologies, it should be expected that the capital charge difference between the IMA and SA should be lower than before, implying a lower cliff. Higher differences will be logical for instruments/securities for which the underlying risks are demonstrably not captured or only coarsely overestimated under SA.

- **What are the dynamics of VaR vs. expected shortfall?**

VAR is now considered as a straightforward and useful metric for practitioners for day-to-day risk management. P&L can be mapped to or associated with a specific day’s market movements and realized P&L.

Estimating the likelihood and impact of a specific tail event is difficult and subject to computational uncertainty. This is further exacerbated by the calibration horizon of one year. The uncertainty of tail events, and the corresponding error bands, will impact capital charge at the desk level, making return estimates and capital management challenging.

The computation of ES will present challenges for current Monte Carlo or historical VAR computation frameworks. This will be even more so for banks with legacy based feeder framework, where the P&L vectors are generally generated at the business/desk level and aggregated at the enterprise level, resulting in computation and reporting latency that can be as long as one business day.

This will cause distinct challenges in the creation of a common data and computation framework across risk, finance and front office. It will also challenge the new tail-focused risk parameter, as opposed to current VAR frameworks where the size and dispersion of tail events are excluded from consideration.

From a computational perspective, VAR-based risk parameters only had to be back-tested and tractable up to the selected confidence level. In contrast, ES measures represent the expected

value of the loss distribution in the tail beyond the specified quantile. The practical implication is that computation models have to capture and quantify the extremely low-probability events beyond the VAR thresholds.

In FRTB this represents two challenges: first is the calibration of IMA models with sparse data; the second is defining the methodology used to back-test and validate data on a limited set of historical tail events which, by their very nature, are rare.

This situation extends to back-testing the ES parameter as well. BCBS approach is to validate the ES parameter with two VAR measures at different levels; however, this approach does not fully capture the extreme tail of the loss distribution.

From a theoretical perspective the transformation from VAR to ES is more robust as it is focused on tail risk modeling. However, its applicability, usability and acceptance as a risk management tool has yet to be borne out. It is possible that if the measure is unstable and not tractable, its practical application as a risk management tool may be limited.

There has been a long period of familiarity in working with VAR in recent years with stress tests. Within banks and across other stakeholders there will be a period of time before ES is understood and accepted as a risk metric for risk management and capital charge computations.

- **Why is there so much talk around model validation and P&L attribution?**

P&L attribution tests determine whether banks can use the internal model approach to estimate market risk and compute capital requirements. If banks expect to not pass this test by significant margins, they will likely elect the SA approach, thus sacrificing capital efficiency.

Predictably passing the current prescribed approach for P&L attribution test will be challenging for several banks and trading portfolios. This is because of anomalies in the prescribed approach. The most noteworthy one is that a well-hedged portfolio will be more likely to fail the test compared to one that has directionality or market delta.

For IMA, monthly P&L attribution tests require that the risk theoretical P&L (daily P&L predicted by the risk management model based on the approach prescribed by FRTB) matches the hypothetical P&L (based on mark-to-market models at trading desk levels which are calculated by revaluing positions held at the end of previous day using market process at the end of current day).

- **What are non-modellable risk factors and why should a banks be concerned?**

Non-modellable risk factors (NMRFs) come into play when there is lack of security-specific trade and market data availability and quality. Minimization of NMRFs will require availability and sound management of data. Position level market data feeds into computation algorithms have to be robust and optimized for SA, and if required for IMA, at a granular level for stress testing.

Minimization of NMRFs will also require that desk and risk models be in close alignment. The most optimal or necessary way to achieve this will be to use a common framework or system for risk and mark-to-market computations/valuations.

Non-modellable risk factors in the internal model approach that cannot be systematically or predictably quantified due to lack of data. The fundamental question being posed by industry participants is that if the risks are non-modellable, then what is the underlying logical framework for their quantification?

- **What will be FRTB's Impact on trading desks and business units?**

Through its capital charge construct for individual trading desks, FRTB will have significant impact on the structure, scope and scale of trading activities. Banks will need to optimize their regulatory trading desk structures given the limited scope for diversification benefits. Some trading desks that deal in instruments that have low trading volumes will likely have high capital charge under FRTB even if the bank and other market participants feel that there is reasonably good liquidity. Non-linear and structured securities will also be assessed with higher capital charge, particularly for security structures with high convexity/curvature.

A second risk to desks will come for IMA desks that may fail P&L attribution test because their input parameters are not frequently traded or there is noise around model generated sensitivities. These will impact pricing of new transactions/trades, particularly those with long maturities or holding periods. At the same time, return expectations from existing positions with longer holding periods may have to be adjusted if a trading book moves from IMA to SA, and vice versa.

Hardest hit trading activities will be for securities with conservative liquidity horizons, residual risk add-on and NMRFs. Some trading activities, such as foreign exchange options trading, could mitigate the high SA charge by opting for IMA with the expectation of small NMRFs and residual risks. However, banks will be well-advised to conduct bottom-up impact analysis at security and desk level to assess the options for strategic and tactical organizational and desk scaling decisions.

This also implies that trading volumes for instruments and sectors that are currently illiquid may fall into a vicious cycle if banks exit because of higher capital charges under FRTB, thus further pressuring trading volumes and liquidity. This may include off-the-run sovereign bonds and highly-rated corporates that may not have high trading volume within some regulatory jurisdictions. This could also exacerbate systemic risk with concentration among large banks if smaller banks cease trading in these securities.

- **Is FRTB a sound framework for risk management and capital charge measurement?**

As will be expected, FRTB can be viewed as onerous, misplaced or inconsistent — and several industry stakeholders have expressed this sentiment. In defense of the FRTB regulation, one can state that, by design, universal regulations cannot fit all constituents, and it is a balancing act to capture current and foreseeable risks. Prescriptive factors and methodologies are designed to encourage and promote standardization and prevent banks from using their own methodologies that, by default, make comparisons in risk profiles challenging for regulators. For counterparty risk management and for assessment of systemic risk, standardization

is desirable. This holds even if the one size fits all approach can distort reported risk measures to a limited extent. The lesser of two evils is thus standardization where banks and local regulators can agree on interpretations, application and implementation.

The risk is that if large and medium-sized banks adopt the Standardized Approach for most of their trading books and activities, there will be a strong possibility for unmodelled, and therefore latent, systemic risks. In the evolution of the search for a universal risk parameter, there have been several contenders including VaR and stress testing frameworks. In addition to the individual inadequacies and pitfalls of universal parameters, the threat from standardization is that gaps are magnified from a systemic risk perspective with widespread adoption. The hard choice for regulatory standard setters is to balance between consistency and standardization of risk quantification frameworks. The tradeoff becomes comparability of risk parameters across institutions vs. allowing for flexibility and differentiation, which prevents magnification of systemic risk.

The appraisal of FRTB as a regulatory framework and standard for trading books should span three questions: (1) are the capital requirements optimal and consistent across the underlying risks; (2) are the required processes and computations feasible and desirable from a technology and personnel resources; (3) and finally, will this framework lead to better and suitable risk measures and transparency to thwart institution-specific or systemic stress and crises? Our view is that FRTB is a good foundation but will need selective changes and refinements to address risk transparency and management, and then as a framework for quantifying capital charges.

- **How important is market data in the FRTB framework?**

The critical importance of the availability and access to a “committed quote” and market process – by default to market data vendors. A prospective question here is the consequent individual responsibilities of vendors and banks if there are unexpected gaps in the collection, availability or distribution of market prices. This may be costly from a capital perspective if a desk fails the P&L attribution test and falls to SA with consequent cliff effect. Avoidance of these situations will require reliable data integrity and availability, and possibly

regulatory approval or oversight of data vendors. Large banks using IMA may not elect to share or pool market risk data if they believe this data represents a competitive advantage. Mechanisms to address the competitive dynamics of banks as well as regulatory factors will be advisable.

- **How will capital be allocated to trading desks under FRTB?**

Under FRTB banks will be well-advised to follow a three-step process. First, identify a regulatory trading desk (RTD) structure that is conducive for management and segregation of trading desks. The second is to assess the feasibility of computing SA and IMA capital for each desk. The third is to modify the RTDs to optimize capital charge. Once this structure has been decided upon, top of the house/enterprise level capital should be assessed. FRTB stipulates that there will be a top of the house floor to IMA capital based on a percentage of the SA capital from those RTDs. FRTB does not prescribe what that floor will be and, as of this writing, the floor percentage remains unresolved.

Calibration of the floor will be critical to defining how the IMA, and more broadly how the FRTB, will be deployed. As calibration approaches 100%, there will be increasingly little cause for banks to implement the IMA and capital costs will rise many fold. This will be particularly true for banks which currently operate under the Basel II or II.5 Advanced Approach. As calibration falls below a certain inflection point, at which IMA capital meets or exceeds floor capital, then floor cost will increasingly not constrain IMA usage except in cases of extreme or unintended model events.

- **What are the prospects of postponement of FRTB Finalization and Implementation Timelines?**

The sheer scope and breadth of changes in regulatory frameworks over the last five years has stretched supervisory resources globally, particularly those who are responsible for interpreting and implementing the new regulations and associated supervision. In the US, the CCAR process has sapped regulatory and institutional resources because of its complexity and implementation challenges. Similar regulatory initiatives in Europe including SA-CCR have kept regulators and supervisors very busy as well. FRTB stipulates that national regulatory bodies are required to finalize technical guidance in

the form of country-specific regulations and associated laws by January 2019, followed by live implementation by banks by the end of that year. Historically, country-specific technical guidance has been provided by jurisdictional regulatory bodies within a year of BCBS releases. However, at the time of this writing, not all major jurisdictions have taken the preliminary steps to communicate their agreement with FRTB timelines.

Given the complexity and scope of FRTB, jurisdiction-specific technical guidance and implementation guidelines will be governed by the heterogeneity and state of preparedness of respective banking systems and regulatory resources. Another factor will be the number and proportion of banks that elect IMA for individual desks. Regulators will also want to stipulate the extent of their acceptance of bootstrap approaches for banks with legacy data and computation frameworks as opposed to nudging or requiring them to undertake transformational approach. Given the wide-ranging and long-term impact of FRTB on capital and risk management, it will be optimal if national interpretations and technical standards are tailored to conform to respective banking, market, supervisory and macroeconomic environments.

A rush to establish local standards may result in coarse technical interpretations and lack of collaboration between regulatory bodies, banks and other stakeholders. A collaborative, stepwise and consensus approach towards setting local technical requirements is advisable to ensure stability and resilience of banking systems while preserving individual banks' respective competitive positions both nationally and globally. Early definition and adoption of national FRTB standards will enable supervisors to participate in bank-level and system-wide impact studies as observers and remediate anomalies and unexpected outcomes. This is particularly important for FRTB as several of its elements are new and untested, e.g. P&L attribution tests, capital charge algorithms and the SA floor.

There is ample precedent for local regulators to extend implementation deadlines for major BCBS guidelines and rule changes. The postponement of the SA-CCR implementation in Europe is a case in point and this may well turn out to be the case for FRTB as well. We would like to state here that such postponements do not only impact the credibility of the standard setting regulators, but also of

implementation managers and other stakeholders who diligently apply for budgets and push hard to have their banks become compliant, only to watch as the timing is determined by the preparedness of laggard banks and regulatory jurisdictions.

Despite the underlying challenges, it will be advisable for local regulatory and supervisory bodies to issue technical guidance well in advance of the January 2019 deadline. This will provide banks more time for implementation – which, as described above, will include impact analyses, organizational adjustments, system tests, and phasing out of existing frameworks and methodologies as applicable. On their part, banks should ideally aim to conduct concurrent runs with FRTB methodologies and frameworks for 2018 year-end close to minimize surprises and adjustments.

- **How should a bank approach FRTB's adoption and implementation?**

FRTB is designed to make regulators more aligned and aware in the approval of regulatory trading desk structures, the use of IMA at the desk level and model validation while maintaining jurisdictional consistency. Banks will naturally move towards optimizing around the least stringent and restrictive regulatory interpretation of methodologies and model inputs and seek the necessary regulatory approvals.

Unlike other marginal or evolutionary changes in regulations, FRTB will require a significant transformation in the way banks organize and run their trading businesses and compute their market risk capital. The same can be said for SA-CCR for credit risk capital requirements. Moreover, FRTB and SA-CCR are just two elements in a much larger package of new BCBS requirements for capital adequacy.

Risk, finance, technology and operations will be impacted by the transformation. Banks should be prepared for transformation that will initially appear to be intrusive. Bank managements will be well advised to reflect on and plan for technology, computational, and governance frameworks that must be prepared beyond 2019.

The adoption and compliance with FRTB framework will entail multi-year efforts and significant budgetary outlays. In addition, the new Basel capital requirements will be phased in across

the next five years. To manage the deadlines, banks will have to prioritize efforts and projects against competing priorities.

Bank managements should elect to launch and undertake this transformation with adequate time frames to avoid rushing to meet deadlines without a sustainable and cost effective design and implementation. Timely organization of FRTB project teams with specific responsibilities and deliverables will have ample opportunity for optimally aligning their trading books and business structures with FRTB capital allocations.

Taking into consideration the lengthy supervisory approval process and the extraordinary extent of changes made to the market risk capital framework, banks need to move to implementation mode rather earlier than later. There will very likely be a crunch for regulatory resources around mid-2018 as individual bank RTD and approvals get piled up.

Institutions who believe that FRTB will be watered down or delayed in any significant way may have to play catch-up with very difficult challenges, slipping timelines and unexpectedly high budgetary outlays. A prudent strategy will be to tackle FRTB head-on for what it is and begin to adjust businesses accordingly.

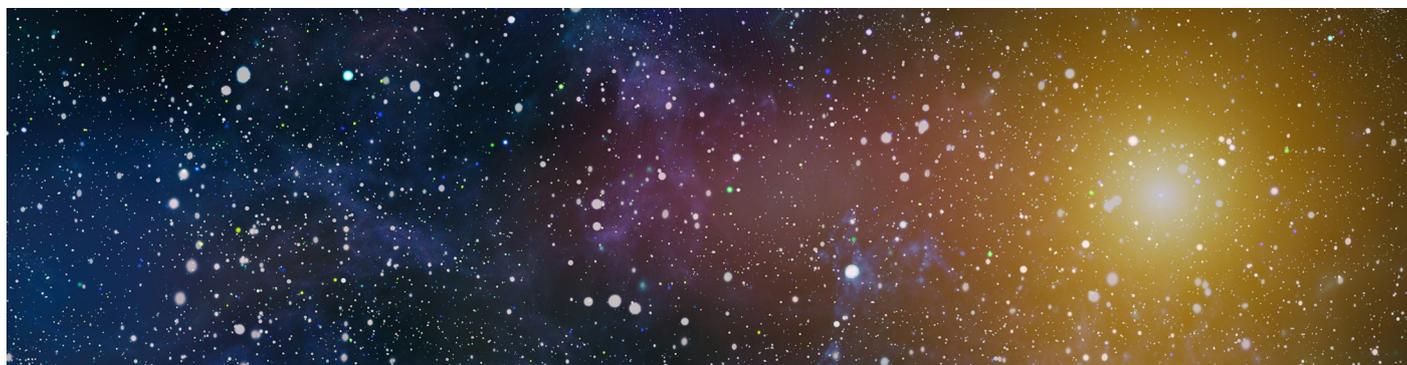
### • **What are bank/enterprise level Implications of FRTB?**

Once capital requirements of banks' existing and potential trading portfolios is estimated under the new guidelines, senior bank managements

will have to determine the return and feasibility of continuing certain trading activities and businesses. Trading books with inadequate return on capital may have to be evaluated for sunset or exit. For activities that are retained, the requirement will be to implement new processes and risk management practices. Implementation of the new internal model standards will be challenging, requiring banks to make extensive changes to their existing architectures.

There will be continual modifications and fine-tuning of FRTB standards, but it is clear to us that banks that implement FRTB requirements effectively and efficiently will strengthen their competitive positions, and not be pushed into expending resources to create avenues for regulatory arbitrage and take undue risks that may be latent from their own view.

Historically this has been a general response to more rigorous regulation to maintain return on capital. FRTB is designed to prevent this. For banks and institutions with legacy frameworks, budget constrained resources and a kick-the-can culture, the requirement to adopt FRTB also represents a significant opportunity for risk management, and technology functions to seek required budget outlays to undertake this transformation. There is certainly the possibility that the prevailing political and legislative winds may do away with FRTB and some aspects of the Basel framework altogether. This appears to be beyond the realm of possibilities as the G20 leaders and representatives explicitly affirmed their support for Basel (dear editor, please footnote for our G20 piece)



1. BCBS, Revisions to the Basel II market risk framework (updated as of 31 December 2010), February 2011, [www.bis.org/publ/bcbs193.pdf](http://www.bis.org/publ/bcbs193.pdf)
2. Based on 4 BCBS QIS studies found in the Impact analysis (section 4) of the FRTB explanatory notes found here [http://www.bis.org/bcbs/publ/d352\\_note.pdf](http://www.bis.org/bcbs/publ/d352_note.pdf) According to the QIS studies, revised capital requirements are likely to be 40% higher on a weighted average basis, including all exposures.
3. Section 4.1, Table 2 of the BCBS explanatory notes to the FRTB found here [http://www.bis.org/bcbs/publ/d352\\_note.pdf](http://www.bis.org/bcbs/publ/d352_note.pdf)